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Proceedings and Transactions of
The South London Entomological
and Natural History Society

1959

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November 1960



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OBJECTS & ACTIVITIES OF THE SOCIETY

The Society has for its objects the promotion and advancement of research in Biological Science, and its diffusion by means of meetings at the Society's Rooms for the reading of original papers, discussions and lectures, by public exhibitions, by field meetings, by the issue of publications, the formation of typical collections and of a library, and by such other means as the Council may from time to time determine.

Meetings. Indoor Meetings at Rochester Row are generally held twice monthly, on second and fourth Thursdays at 6.30 p.m. Field Meetings take place throughout the Summer.

The Council invites the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading papers and exhibiting specimens.

The Society possesses representative collections of most orders of insects and an extensive library. These are available at all Ordinary Meetings. Members may borrow books at meetings or by post. Donations of suitable insects and books are much appreciated.

There is also a big collection of lantern slides, mainly of insects in all stages, from which series may be borrowed. Microscopes are available for home use.

SUBSCRIPTIONS

Entrance Fee, 7/6. Ordinary Members, £1 : 11 : 6 p.a.; Country Members, £1 : 1 : 0 p.a.; all members under 21, 10/0 p.a. Life Membership, Twenty Guineas.

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Should be addressed to the Hon. Secretary, B. GOATER, B.Sc., F.R.E.S., 71, Grants Close, Mill Hill East, N.W.7.

INSTRUCTIONS TO EXHIBITORS

(These apply to *all* meetings, not only to the Annual Exhibition.)

Attention to the following points will greatly add to the scientific value of the exhibits and our Proceedings, besides assisting the Publication Committee in preparing the reports for publication, a task which, in the past, has involved a quite unjustifiable amount of labour and time.

LABELLING OF EXHIBITS.

Adequate labelling of all exhibits is essential; such labelling to include:—

- (a) *name and address of exhibitor*,
- (b) *order and name* (generic and specific, with author of the trivial name) *of each species*,
- (c) *locality* (at least County or Country), or, in the case of bred specimens, the place of origin,
- (d) *date* (at least the month and year) of capture or breeding (or, in the case of a series, first and last dates),
- (e) *any other information of scientific interest*, such as "Gynandromorph", etc., relating to any particular specimen.

REPORT FOR PROCEEDINGS.

A report, including all the points mentioned above for labelling, and amplified to give short details of any special aberrations, gynandromorphs (e.g. left side male, right side female), or other points of interest, *must be handed to the Recorder when the exhibit is taken in (at the Annual Exhibition) or to the Editor (at Ordinary Meetings).*

Such report must be written or typed (preferably typed) ON ONE SIDE OF THE PAPER ONLY, WITH A 2 INCH MARGIN ON THE LEFT SIDE, WITH AT LEAST DOUBLE SPACING BETWEEN LINES, in the form used for the record in the Proceedings.

Where the author of a trivial name is not known, a blank space should be left for its insertion, but every endeavour should be made to furnish this in the first instance, to avoid misunderstandings.

INSTRUCTIONS TO SPEAKERS

Speakers wishing to submit papers for publication, after reading, should give them to the Editor at the end of the meeting or send them to him as soon as possible afterwards, for consideration by the Publication Committee of the Society.

Naturally, not *all* the papers read or talks given to the Society are suitable for publication in the Transactions of the Society, and the Council, acting through the Publications Committee, reserves the right to refuse those papers it considers unsuitable.

The relevant Bye-law (26) (d) states that "all papers read or announced at any meeting and accepted for publication in the Society's publications shall become the property of the Society, unless otherwise stipulated before the reading or announcement thereof".

The Society will be very pleased to receive papers for consideration that may be suitable for reading in title. These should be sent to the Editor.

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LIST OF MEMBERS

(Revised to 29th June 1960)

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10. 1.1951.	10. 1.1951.		Hon.	GIFFORD, WALTER S., R.F.D., No. 2, Greenwich, Connecticut, U.S.A. <i>l</i> .
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1957	AGASSIZ, D. J. L., Weald Cottage, Heyshott, Midhurst, Sussex. <i>c</i> , <i>l</i> , <i>ml</i> .
1956	AKESTER, W. J., F.R.P.S., 1, Holland Court, Natal Road, Avondale, Salisbury, S. Rhodesia. <i>nat. phot</i> .
1956	ALFORD, D. V., 7, St. Martin's Approach, Ruislip, Middx. <i>l</i> .

- 1951 ALLAN, P. B. M., M.B.E., M.A., F.S.A., F.R.E.S., F.Z.S., No. 4, Windhill, Bishop's Stortford, Herts. *l*.
- 1950 ALLEN, Miss D. M., "Cedars", Furzedown College, Wellham Road, Tooting, London, S.W.17. *nat. hist.*
- 1943 ALLEN, DONALD, F.R.P.S., F.R.S.A., F.R.E.S., 431, Streetsbrook Road, Solihull, Warwickshire. *hym, ent, l, nat. phot, mi.*
- 1951 ALLEN, Rev. P. V. M., 1, Flint Cottages, Tunstall, nr. Sittingbourne, Kent. *l*.
- 1959 ALSTON, H. N. E., 31, Ebbisham Road, Worcester Park, Surrey. *l*.
- 1956 ANSORGE, Sir ERIC, C.S.I., C.I.E., F.R.E.S., "Timbers", Welders Lane, Chalfont St. Peter, Bucks. *l, c.*
- 1953 ASAHINA, S., D.SC., Totsuka 3-chome, 123, Shinjuku-ku, Tokyo, Japan. *od.*
- 1956 ASHBY, Miss F. A., 20, Westbrook Road, S.E.3. *c.*
- 1953 ASHBY, G. J., F.R.E.S., *Council*, c/o Zoological Society of London, Regent's Park, London, N.W.8. *ent.*
- 1950 ASHWELL, D. A., "Scolt", Parsonage Lane, Bishop's Stortford, Herts. *g, od, hym, nat. phot.*
- 1946 ASTBURY, C. F., c/o 69b, St. Helens Park Road, Hastings, Sussex. *l*.
- 1957 ASTON, A. E., B.A., F.R.E.S., 1, Aysgarth Road, Dulwich Village, London, S.E.21. *l, d.*
- 1934 ATKINSON, J. L., No. 2, Gatcombe House, Littlehempston, Nr. Totnes, Devon. *l*.
- 1952 BAILEY, KARL E. J., B.D.S. HON., 73, Botley Road, Oxford. *l*.
- 1952 BAKER, B. R., B.SC., A.M.A., F.R.E.S., 71a, Berkeley Avenue, Reading. *l, t.*
- 1939 BAKER, Major D. B., R.A.O.C., F.R.E.S., c/o 7, Tabor Court, Cheam, Surrey. *hym.*
- 1953 BAKER, J. A., B.A., 53, Cambridge Road, Middlesbrough, Yorks. *l, t.*
- 1947 BALFOUR-BROWNE, Prof., W. A. F., M.A., F.R.S.E., F.R.E.S., F.L.S., Brocklehurst, Collin, Dumfries. *c.*
- 1942 BANNER, JOHN V., M.R.C.S., L.R.C.P., F.R.E.S., "Wykehurst," 41, Varndean Gardens, Brighton 6, Sussex. *l*.
- 1958 BARHAM, C. S., B.SC., 19, Westbury Road, Ipswich, Suffolk. *c.*
- 1953 BARTON, Major B. C., O.B.E., Castle Mead, Highcliffe, Christchurch, Hants. *l*.
- 1948 BAXTER, L. N., 16, Bective Road, Forest Gate, London, E.7. *l. breeding.*
- 1948 BAXTER, R. N., 16, Bective Road, Forest Gate, London, E.7. *l. breeding.*
- 1933 BAYNES, E. S. A., O.B.E., F.R.E.S., 2, Arkendale Road, Glengary, Co. Dublin, Eire. *l*.
- 1954 BEAUFOY, S., B.SC.(ENG.), A.M.I.E.E., F.R.P.S., F.R.E.S., 98, Tuddenham Road, Ipswich, Suffolk. *ent.*

- 1957 BEESLEY, W. N., M.Sc., F.R.E.S., 26, The Grove, Addlestone, Weybridge, Surrey. *d.*
- 1949 BELL, C. L., F.R.E.S., 23, Harcourt Road, Redland, Bristol 6. *l.*
- 1947 BEST, A. A., 131, Woodham Lane, New Haw, Weybridge, Surrey. *l.*
- 1956 BIRD, H. W., Redclyffe, The Avenue, Walton Park, Clevedon, Surrey. *l.*
- 1949 BIRKETT, NEVILLE L., M.A., M.B., B.CHIR. (CANTAB.), 3, Thorny Hills, Kendal, Westmorland. *l, c, d.*
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- 1948 BLAXILL, A. D., "St. Marthas," Braiswick, Colchester, Essex. *l.*
- 1926 BLISS, A., "Golden Mist," Whitford, near Axminster, Devon. *l.*
- 1960 BLOCKEY, Air Vice Marshal P. S., C.B., C.B.E., B.A., Vanfold, Fernhurst, Haslemere, Surrey. *l.*
- 1959 BLUNT, W. H., 106, Bardsley Green, Birmingham, 9. *ent.*
- 1925 BLYTH, S. F. P., 6, Hatherley Road, Winchester, Hants. *l.*
- 1948 BOLINGBROKE AND ST. JOHN, THE VISCOUNTESS (née FROHAWK, Valezina), Essendene, Cavendish Road, Sutton, Surrey. *nat. hist, ent.*
- 1948 BOLTON, E. L., Lyncombe, Stagbury Avenue, Chipstead, Surrey. *l.*
- 1948 BOWATER, Lt.-Col. W., M.C., B.D.S., T.D., D.L., 41, Calthorpe Road, Edgbaston, Birmingham, 15. *l, heredity.*
- 1944 BOWDEN, S. R., B.Sc., A.R.C.S., F.R.E.S., 53, Crouch Hall Lane, Redbourn, Herts. *l, g.*
- 1946 BOYCE, B., 16, Highland Road, Chichester, Sussex. *l.*
- 1948 BOYES, J. D. C., B.Sc., A.R.I.C., A.R.P.S., Wimborne, Millfields, Nantwich, Cheshire. *l.*
- 1960 BRADFORD, E. S., 124 Upper Street, London, N.1. *ent, ml.*
- 1946 BRADLEY, J. D., F.R.E.S., 53, Osterley Road, Isleworth, Middx. *l.*
- 1947 BRETHERTON, R. F., C.B., M.A., F.R.E.S., Ottershaw Cottage, Ottershaw, Surrey. *l.*
- 1933 BRETT, G. A., B.Sc., A.R.C.S., D.I.C., F.R.E.S., 2, Claygate Lane, Hinchley Wood, Esher, Surrey. *ent.*
- 1958 BRIDGES, Lt. Col. H. C., c/o Grindleys Bank, 54, Parliament Street, London, S.W.1.
- 1940 BRITTEN, H., M.M., F.R.H.S., F.INST.P.A., "Newholme," 21, Toller's Lane, Old Coulsdon, Surrey. *ent (Chalcididae).*
- 1930 BROOKE, Miss W. M. A., F.L.S., Greenglade, Malvern Road, Liss, Hants. *ec, ent, b, marine life.*
- 1954 BROWN, F. C., F.Z.S., 6, Osmond Gardens, Wallington, Surrey. *Giant Silk Moths.*
- 1952 BRUSH, H. J., 3, Oakdene Road, Bookham, Leatherhead, Surrey. *ent.*
- 1952 BRYCE, D., The Bungalow, Cliffe, Gt. Harwood, Blackburn, Lancs. *l, dip.*

- 1936 BUCK, F. D., A.M.I.P.T.G.M., F.R.E.S., *Hon. Editor*, 36, Besant Court, Newington Green Road, London, N.1. *c.*
- 1955 BUCKLER, H. A., Sutton Bassett, Market Harborough, Leics. *l, ml*
- 1958 BURGESS, Gp. Capt. L. W., B.A., "Knokeforth", 1, Brittons Cottages, North Weirs, Brockenhurst, Hants. *l.*
- 1946 BURKHARDT, Col. V. R., late R.A., D.S.O., O.B.E., 86, Main Street, Stanley, Hong Kong. *l.*
- 1944 BURNS, B. S., 2, Mead Way, Fareham, Hants. *l.*
- 1948 BURTON, P. J., L.D.S., R.C.S.ENG., F.R.E.S., "Paysanne," Godshillwood, near Fordingbridge, Hants. *l.*
- 1938 BURTON, R. J., L.D.S., R.C.S.ENG., Dinky Cottage, 4, Stanway Road, Stanton, nr. Broadway, Wores. *l.*
- 1947 BUSBRIDGE, W. E., Firwood, 4, Mount Harry Road, Sevenoaks, Kent. *l.*
- 1957 BUSH, D. J. B., 20, Brockenhurst Road, Addiscombe, Surrey. *l.*
- 1953 BUTTERFIELD, A. W., 124, Ashville Road, Leytonstone, London, E.11. *l.*
- 1951 BYERS, F. W., 59, Gurney Court Road, St. Albans, Herts. *l.*
- 1948 CALDERARA, P., A.M.I.E.E., "Stratton Lodge", 26, Manor Road, Barnet, Herts. *l, c.*
- 1957 CAMPBELL, A. M. G., M.A., D.M., F.R.C.P., 79, Pembroke Road, Clifton, Bristol, 8. *ent.*
- 1945 CARLIER, STUART E. W., F.R.E.S., 6, Warwick Buildings, Warwick Road, Solihull, Warwickshire. *l, c.*
- 1950 CAROLSFELD-KRAUSE, A. G., Slotsherrens Have 97, (Kobenhavn)-Vanlose, Copenhagen, Denmark. *l.*
- 1956 CARTER, C. I., 42, Home Close, Long Lane, Heronsgate, Rickmansworth, Herts. *ent. arachnology.*
- 1946 CARTER, R. A., M.A., M.B., M.R.C.P., F.Z.S., 72, Panton St., Cambridge. *c.*
- 1959 CARTER, Lt. Col. W. A. C., Briarfields, Sandels Way, Beaconsfield, Bucks. *l.*
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- 1956 CHATELAIN, R. G., 65, East Drive, St. Mary Cray, Kent. *l.*
- 1958 CHIPPERFIELD, H. E., F.R.E.S., 27, Chilton Avenue, Stowmarket, Suffolk. *lep, hym, col.*
- 1952 CHRISTIE, J., 137, Gleneldon Road, Streatham, S.W.16. *d.*
- 1945 CHRISTIE, L., *Lanternist*, 137, Gleneldon Road, Streatham, S.W.16. *ent.*
- 1954 CLARK, J., 7, Park Road, Bognor Regis, Sussex. *ent.*
- 1951 CLARKE, C. ASTLEY, M.D., F.R.O.P. (Lond.), High Close, Thorsway, Cald, Cheshire. *l.*
- 1936 CLASSEY, E. W., F.R.E.S., 22, Harlington Road East, Feltham, Middlesex. *l.*
- 1960 CLEGG, J., The Educational Museum, Haslemere, Surrey. *aquatic insects.*

ELECTION.

- 1934 COLE, G. A., M.A. F.C.A., Abinger Manor Cottage, Abinger Common, Dorking, Surrey. *l*.
- 1953 COLERIDGE, W. L., The Gnoll, Bishops Teignton, nr. Teignmouth, S. Devon. *ent, orn*.
- 1946 COLLIER, Major A. E., M.C., B.A., F.R.E.S., Lynher, Horsham Rd., Cranleigh, Surrey. *l*.
- 1936 COOPER, B. A., B.Sc., A.R.C.S., F.R.E.S., Entomology Dept., Shardlow Hall, Shardlow, Derby. *c (Elateroidea), ecology, ec. ent, l, nat. phot. (Life Member)*.
- 1947 CORNELIUS, J. A., B.Sc., A.R.I.C., 15, Ringmore Rise, Forest Hill, London, S.E.23. *l*.
- 1922 COUCHMAN, L. E., F.R.E.S., 35, Browne Street, West Hobart, Tasmania. *l*.
- 1928 COURT, T. H., F.R.G.S., "The Pingle", Mill Road, Market Rasen, Lincs.
- 1947 COX, W. A. A., 65, Bamford Road, Bromley, Kent. *ent*.
- 1950 COXEY, S., "Balcombe", 109, Regent Road, Bolton, Lancs. *l*.
- 1953 COXON, G. F., "The White Cottage", Weald, Sevenoaks, Kent. *ent, nat. hist*.
- 1960 CRAMP, A. C., 11, Craigton Road, Eltham, London, S.E.9. *arach*.
- 1960 CRAMP, J. K., 60, Stillness Road, Forest Hill, London, S.E.23. *nat. hist*.
- 1937 CRASKE, R. M., 22, Edge Street, Campden Hill, London, W.8. *ent*.
- 1918 CRAFTURD, CLIFFORD, "Denny," Bishop's Stortford, Herts. *l*.
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, Northwich, Cheshire. *l*.
- 1947 CRIPPS, C. H., M.A., Bulls Head Farm, Eakley Lanes, Stoke Goldington, Newport Pagnell, Bucks. *l, rh. (Life Member.)*
- 1960 CROSS, D. J., 62, Upper Poole Road, Dursley, Glos. *hym*.
- 1949 CROSS, G. S. E., A.C.T.S.INC., 31, Avenue Road, Finchley, London, N.12. *l*.
- 1932 CROW, P. N., F.R.E.S., c/o Westminster Bank, Ltd., Harpenden, Herts. *l*.
- 1950 CRUTTWELL, G. H. W., Old Ford House, Frome, Somerset. *ent*.
- 1954 CUE, P., "Lhasa," Malvern Road, Ashford, Kent. *ent*.
- 1959 CUMING, N. ST. J., 82, Maldon Road, Colchester, Essex. *l, c*.
- 1947 CUNNINGHAM, D., M.A., 42, Rae Street, Dumfries. *l, flora*.
- 1937 CURTIS, A. E., F.R.E.S., "The Cottage," Ifold Estate, Loxwood, Billingshurst, Sussex. *l*.
- 1946 CURTIS, W. PARKINSON, F.R.E.S., M.S.B.E., Ladywell Cottage, Tower Road, Branksome Park, Bournemouth, Hants. *l*.
- 1956 DACIE, J. V., M.D., 10, Alan Road, Wimbledon, S.W.19. *l*.
- 1951 DALY, D. W., P.O. Box 1670, Salisbury, Southern Rhodesia. *ent*.
- 1927 DANBY, G. C., 11, Devon Road, Cheam, Surrey. *l*.
- 1956 DAVIDSON, W. F., F.G.S., 9, Castlegate, Penrith, Cumberland. *l, c*.
- 1951 DAVIS, G. A. N., M.R.C.S., L.R.C.P., Holt Wood, Aylesford, Kent. *l*.

ELECTION.

- 1933 DEMUTH, R. P., M.A., L.R.I.B.A., "Watercombe House", Waterlane, Oakridge, Stroud, Glos. *l*.
- 1930 DENVIL, H. G., F.R.E.S., F.R.H.S., *Council*, 4, Warwick Road, Coulsdon, Surrey. *l, c*
- 1947 DEWICK, A. J., Curry Farm, Bradwell-on-Sea, Southminster, Essex. *l*.
- 1958 DILLON, T. J., 4, Alleyn Crescent, West Dulwich, London, S.E.21. *l*.
- 1945 DIXON, C. H., Northbrook Farm, Micheldever, Hants. *ent*.
- 1958 DOLLIMORE, G. F., Willerby, Ashley Park Estate, St. Ives, Ringwood, Hants. *l*.
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading, Berks. *l*.
- 1958 DOWNES, Cdr. A. S., D.S.O., R.N., Southways, Montserrat Road, Lee-on-Solent, Hants. *ent, orn*.
- 1930 DUDBRIDGE, B. J., B.A., c/o The Secretariat, Dar-es-Salaam, Tanganyika. *ent*.
- 1949 DUFFIELD, C. A. W., M.C., J.P., F.R.E.S., Pickersdane, Brook, near Ashford, Kent. *l, c, hem, homoptera*.
- 1956 DUNN, T. C., B.Sc., D.T., P.T., The Poplars, Chester-le-Street, Co. Durham. *l, esp. ml*.
- 1952 DYSON, R. C., N.D.H., F.R.E.S., 112, Hollingbury Park Avenue, Brighton 6, Sussex. *l*.
- 1937 EASTON, N. T., D.F.H., Westbury, West End Road, Mortimer, Berks. *l, g, nat. phot*.
- 1960 EBBAGE, I., 51, Cholmley Park, Highgate, N.6. *l*.
- 1959 EDMONDS, M. H., 938, Warwick Road, Solihull, Warwicks. *ent*.
- 1949 EDWARDS, F. H., Rockfield, Abbey Road, Worthing, Sussex. *l*.
- 1945 EDWARDS, G. GRAVELEY, Talbot Croft, St Albans, Herts. *l*.
- 1945 EDWARDS, R. C., Arlesley, Pilgrims' Way, Westerham, Kent. *ent*.
- 1933 ELGOOD, W. S., M.A., North Brink, Wisbech, Cambs. *l*.
- 1960 ELLERTON, Capt. J., D.S.O., R.N., Cherry Hay, Meopham, Kent. *l*.
- 1937 EMBRY, B., F.R.E.S., Brocks Ghyll, Newick, Sussex. *l*.
- 1932 ENNIS, L. H., F.C.A., Southery, Milbourne Lane, Esher, Surrey. *l*.
- 1947 EVANS, Miss E., c/o Royal Entomological Society of London, 41, Queen's Gate, London, S.W.7. *nat. hist*.
- 1945 EVANS, L. J., 73, Warren Hill Road, Birmingham 23. *l*.
- 1946 FAIRCLOUGH, R., "Blencathra", Deanoak Lane, Leigh, Surrey. *ent*.
- 1947 FARWELL, I. G., F.R.E.S., "Mayfield Villa", Portmore, Lymington, Hants. *l*.
- 1955 FEARNEHOUGH, T. D., A.MET., 13, Salisbury Road, Dronfield, Nr. Sheffield. *l*.
- 1947 FEILDEN, G. ST. CLAIR, c/o Lloyds Bank, Exeter. *ent*.
- 1946 FERGUSON, L. F., L.D.S., R.C.S., "Harley House," Gloucester Road, Teddington, Middlesex. *c*.

- 1930 FERRIER, W. J., F.R.E.S., 86, Portnalls Road, Coulsdon, Surrey.
l.
- 1940 FFENNEL, D. W. H., Martyr Worthy Place, Winchester, Hants. *l.*
- 1955 FIRMIN, JOSEPH, F.R.E.S., M.B.O.U., 12, Worthington Way, Lenden,
Colchester, Essex. *l.*
- 1943 FORD, E. B., M.A., D.S.C., F.R.S., F.R.E.S., The University Museum,
Oxford. *ent, g.*
- 1920 FORD, L. T., B.A., 28, Park Hill Road, Bexley, Kent. *l.*
- 1960 FORD, R. L. E., F.R.E.S., F.Z.S., Dunkeld, Park Hill, Bexley,
Kent. *ent.*
- 1939 FORSTER, H. W., 32, Park Mead, Harlow, Essex. *c.*
- 1915 FOSTER, T. B., "Downlands", 24, York Road, Selsdon, Surrey. *l.*
- 1948 FRASER, Lt.-Col. F. C., I.M.S.RETD., M.D., M.R.C.S., L.R.C.P.,
F.R.E.S., 55, Glenferness Avenue, Winton, Bournemouth,
Hants. *od, n.*
- 1948 FRAZER, J. F. D., M.A., D.M., PH.D., F.Z.S., F.R.E.S., Stone House,
Harbourland, Boxley, Maidstone, Kent. *rh, r.*
- 1946 FRIEDLEIN, A. F. E., "St. Andrews", 85, Priests Lane, Shenfield,
Brentwood, Essex. *l.*
- 1958 FRIEND, M. J., 160, Brockenhurst Avenue, Worcester Park,
Surrey. *l, ent.*
- 1951 FROHAWK, Mrs. M. J., Essendene, Cavendish Road, Sutton,
Surrey. *ent, nat. hist.*
- 1959 GARDINER, B. O. C., 43, Woodlark Road, Cambridge. *l.*
- 1947 GARDNER, A. E., F.R.E.S., *Council*, 29, Glenfield Road, Banstead,
Surrey. *od, l.*
- 1952 GARLAND, W. A., 1, Testard Road, Guildford, Surrey. *rh.*
- 1954 GERARD, B. McC., 68, Fern Lane, Heston, Hounslow, Middx. *ent.*
- 1950 GENT, P. J., 3, Irthlingborough Road, Wellingborough,
Northants. *l.*
- 1952 GILLMAN, Lt.-Col. H. C. R., M.B.E., R.A., Maddington Manor,
Shrewton, Wilts. *ent.*
- 1950 GOATER, B., B.S.C., F.R.E.S., *Hon. Secretary*, 71, Grant's Close,
Mill Hill East, N.W.7. *l, orn, b.*
- 1936 GOODBAN, B. S., 99, Lime Grove, Eastcote, Ruislip, Middx. *l.*
- 1957 GOODDEN, R. C., Seafields House, Charmouth, Dorset. *l.*
- 1935 GOODLIFFE, F. D., M.A., Lord Wandsworth College, Long Sutton,
Basingstoke, Hants. *ec. ent, d (Chloropidae), c (Dytiscidae).*
- 1942 GOODSON, A. L., 26, Park Road, Tring, Herts. *l.*
- 1955 GOOSEMAN, M. P., F.R.E.S., "Lonicera", Bottesford Road, Bottes-
ford, Scunthorpe, Lincs. *l, c.*
- 1949 GOULD, A. W., 30, Shooters Hill Road, Blackheath, S.E.3. *c.*
- 1936 GOWING-SCOPES, E., F.R.E.S., "Oakhurst", Oakwood Road,
Crofton, Orpington, Kent. *c.*
- 1958 GREENWOOD, J. A. C., O.B.E., F.R.E.S., Woodcote, Horsell Park,
Woking, Surrey. *l.*

- 1950 GREENWOOD, K. C., M.B., CH.B., "Rydal," 1, Conyers Avenue, Birkdale, Southport, Lancs. *l, ml.*
- 1953 GRIFFITHS, G. C. D., F.R.E.S., 13, Woodlands Avenue, Finchley, London, N.3. *d (Agromyzidae)*
- 1957 GROVES, E. W., 143, Carshalton Park Road, Carshalton, Surrey. *hem, d, hym. ec.*
- 1950 GULLY, J. G., Howells Bank Farm, Ringmer, Sussex. *l.*
- 1955 GURDON, J. B., Furnell House, Frensham, Surrey. *l.*
- 1958 GYSELMAN, Miss Y. P., Chy-an-Gwel, Crippas Hill, St. Just, nr. Penzance, Cornwall. *l, c.*
- 1947 HAGGETT, G. M., F.R.E.S., 1, Torton Hill, Arundel, Sussex. *l, ent.*
- 1953 HALL, D. G., 34, Ellerton Road, Wandsworth Common, London, S.W.18. *c.*
- 1949 HALL, STEWART SCOTT, C.B., M.SC., F.R.A.E.S., 9, Laurel Court, Hawthorne, Melbourne, E.3, Australia. *l.*
- 1955 HALSTEAD, D. G. H., 1, Barry Avenue, Windsor, Berks. *c.*
- 1944 HAMMOND, H. E., F.R.E.S., 16, Elton Grove, Birmingham 27 *l, ent.*
- 1959 HAMMOND, N., 121, Crofton Park Road, London, S.E.4. *arach.*
- 1949 HANSON, S. M., F.R.E.S., 11, The Close, Spring Grove Road, Isleworth, Middx. *l. (Life Member.)*
- 1948 HARBOTTLE, The Rev. A. H. H., M.A., 6, Ranelagh Grove, St. Peters, Broadstairs, Kent. *l.*
- 1943 HARDS, C. H., F.R.E.S., 40, Riverdale Road, Plumstead, London, S.E.18. *l.*
- 1956 HARDY, D. E., District Bank House, Heswall, Wirral, Cheshire. *l.*
- 1943 HARPER, Comdr. G. W., R.N., F.R.E.S., Neadaich, Newtonmore, Inverness-shire, Scotland. *l.*
- 1954 HARPER, M. W., Neadaich, Newtonmore, Inverness-shire, Scotland. *l, ent.*
- 1936 HARRIS, W. H. A., "Kemel," Oak Tree Close, Stanmore, Middlesex. *l.*
- 1951 HARRISON-GRAY, M., 14a, Lancaster Grove, London, N.W.3. *Saturniidae.*
- 1953 HARVEY, J. G., S.R.N. (Staff), R.A.F. Hospital, Ely, Cambs. *c.*
- 1924 HAWKINS, C. N., F.R.E.S., 23, Wilton Crescent, Wimbledon, London, S.W.19. *l, c, g.*
- 1958 HAXBY, C. R., 4, Windermere Terrace, Bradford, 7. *ent.*
- 1938 HAYNES, R. F., 29, Fairfield Drive, Dorking, Surrey. *l.*
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Instituto Miguel Lillo, Calle Miguel Lillo, 205, Tucuman, Republica Argentina. *l, orn, c.*
- 1954 HEATH, JOHN, F.R.E.S., c/o The Nature Conservancy, Merlewood Research Station, Grange-over-Sands, Lancs. *ml.*
- 1920 HEMMING, A. FRANCIS, C.M.G., C.B.E., F.Z.S., F.R.E.S., 28, Park Village East, Regents Park, London, N.W.1. *l.*

- 1924 HENDERSON, J. L., *Hon. Treasurer*, 6, Haydn Avenue, Purley, Surrey. *c.*
- 1951 HERBULOT, C., 31, Av. d'Eylau, Paris 16e, France. *l.*
- 1954 HERVEY, The Rev. Canon G. A. K., M.A.(OXON.), Great Salkeld Rectory, Penrith, Cumberland. *ent, orn, b.*
- 1945 HESLOP, Mrs E. A., "Belfield," Poplar Road, Burnham-on-Sea, Somerset. *l. nat. hist.*
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., "Belfield", Poplar Road, Burnham-on-Sea, Somerset. *l, nat. hist.*
- 1946 HEWSON, F., F.R.E.S., 23, Thornhill Drive, Gaisby, Shipley, Yorks. *l, hym. parasitica.*
- 1948 HICKIN, N. E., PH.D., B.SC., F.R.E.S., *Council*, Home Farm, Fetcham, Surrey. *t.*
- 1956 HIGGINS, W. J., Standard Nursery, Old Worthing Road, East Preston, Sussex. *l.*
- 1948 HILLABY, J. D., F.Z.S., F.R.E.S., 85, Cholmley Gardens, London, N.W.6. *ent.*
- 1945 HINTON, H. E., PH.D., B.SC., F.R.E.S., Department of Zoology, Bristol University, Bristol, Glos. *ent.*
- 1949 HOARE-WARD, J. W., Box's Farm, Horsted Keynes, Sussex. *l.*
- 1959 HOCKING, Miss S. K., Imperial College Hostel, Prince Consort Road, London, S.W.7. *ent, arach.*
- 1953 HODGKINSON, ALEXANDER, A.R.C.A., 12, Kitson Road, Barnes, London, S.W.13. *l.*
- 1956 HOMER, T. J. G., M.A., A.M.INST.T., Yelton Hotel, Hastings, Sussex. *l.*
- 1950 HONEYBOURNE, T. J., F.R.E.S., "Laceys," 97, Birchwood Road, Wilmington, Dartford, Kent. *l.*
- 1945 HOWARD, A. P., 65 Hale Lane, London, N.W.7. *ent.*
- 1927 HOWARD, J. O. T., M.A., *Council*, Wycherley, Deepdene Wood, Dorking, Surrey. *l.*
- 1953 HOWARTH, Mrs. HELEN, "Arrochar", Barnet Gate, Arkley, Herts. *l, b.*
- 1931 HOWARTH, T. G., B.E.M., F.R.E.S., F.Z.S., "Arrochar", Barnet Gate, Arkley, Herts. *l.*
- 1934 HUGGINS, H. C., F.R.E.S., 65, Eastwood Boulevard, Westcliff-on-Sea, Essex. *l, ent.*
- 1947 HUMPHREY, S. W., Pear Tree House, Roade, Northamptonshire. *l, rh. (Life Member.)*
- 1957 HURWORTH, P., 10, Linden Grove, Rumney, Cardiff. *rh. c.*
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l.*
- 1950 HYDE, G. E., F.R.E.S., "Pantiles", Warnington Drive, Bessacarr, Doncaster, Yorks. *l, od.*
- 1953 HYDE, R. A., "Woodside," Reading Road, Finchampstead, Berks. *c.*
- 1950 HYDE-WYATT, B., 108, Lindsay Road, Worcester Park, Surrey. *od, c, l.*

ELECTION.

- 1956 IMBER, S. F., 241, Mayall Road, Herne Hill, London, S.E.24. *rh.*
 1953 IVES, Major D. H., R.A., Highbreak, Princes Road, Rhuddlan, Flintshire. *l.*
- 1956 JACKSON, Miss D. J., North Cliff, St. Andrews, Fife. *c, hym. par.*
 1940 JACKSON, Capt. REGINALD A., C.B.E., R.N., F.R.E.S., Middle Farm House, Codford St. Mary, Warminster, Wilts. *ent, l.*
 1923 JACOBS, S. N. A., S.B.ST.J., F.R.E.S., *Trustee*, "Ditchling", 54, Hayes Lane, Bromley, Kent. *ml, eml.*
 1955 JACOBY, M. C., 231, Cauldwell Hall Road, Ipswich, Suffolk. *ent.*
 1948 JANSON, D. B., 44, Great Russell Street, London, W.C.1. *ent. (Life Member).*
 1925 JARVIS, C. MACKECHNIE, F.L.S., 19, Sloane Gardens, London, S.W.1. *c.*
 1938 JARVIS, F. V. L., B.SC., F.R.E.S., "Corbière", 33, Greencourt Drive, Bognor Regis, Sussex. *l, g.*
 1947 JAY, E. P., Surrey Cottage, Littlehampton, Sussex. *l.*
 1951 JEFFERSON, T. W., 37, Riversdale Terrace, Sunderland, Co. Durham. *l.*
 1948 JEFFS, G. A. T., Nunsholme, Nuns Corner, Grimsby, Lincs. *l, ent.*
 1958 JENNER, D., Walnut Row, Park Farm, Larkfield, Maidstone, Kent. *ent.*
 1957 JOHNSON, Major F. L., M.B.E., T.D., F.R.E.S., 25, Fermoy Road, Thorpe Bay, Essex. *rh.*
 1945 JOHNSON, Major-General Sir GEORGE F., K.C.V.O., C.B., C.B.E., D.S.O., Castlesteads, Brampton, Cumberland. *l, orn.*
- 1956 KEITH-JOHNSTON, COLIN, 350, Finchley Road, London, N.W.3. *l.*
 1946 KEMP, J. K. C., 12, Nab Wood Crescent, Shipley, Nr. Bradford, Yorks. *l.*
 1956 KENNARD, H. A., Torns, Ashburton, Devon. *l, ml.*
 1943 KERSHAW, Col. S. H., D.S.O., Alderman's Place, Aspley Heath, Bletchley, Bucks. *l.*
 1928 KITTLEWELL, H. B. D., M.A., M.B., B.CHIR., M.R.C.S., L.R.C.P., F.R.E.S., Dept. of Zoology, University Museum, Oxford. *g, l.*
 1947 KLIMESCH, J., Donatusgasse 4, Linz-a-Donau, Austria. *ml.*
 1944 KLOET, G. S., F.Z.S., F.R.E.S., 4, Devonshire Park Road, Davenport, Stockport, Cheshire. *ent.*
 1955 KLOTS, Prof. ALEXANDER B., B.S., M.S., PH.D., 215, Young Avenue, Pelham, New York, U.S.A. *l, systematics, ecology.*
 1959 KNIGHT, J. E., Doughlan Cottage, Ross-on-Wye, Herefs. *l.*
 1958 KNILL-JONES, R. P., Brooklands, Freshwater, Isle of Wight. *l.*
- 1959 LANE, C. F., 55, Garlichill Road, Epsom Downs, Surrey. *l.*
 1947 LANFEAR, A. H., "Highclere," 20, South Eastern Road, Ramsgate. Kent. *l.*
 1951 LANGMAID, J. R., B.A., M.B., B.CHIR., 9, Craneswater Park, Southsea, Portsmouth, Hants. *l.*

- 1956 LANGTON, P. H., 17, First Avenue, Charmondean, Worthing. *c, l.*
- 1941 LAST, H. R., F.R.E.S., 12, Winkworth Road, Banstead, Surrey.
c, l.
- 1946 LATHAM, F. H., F.R.E.S., "The Elms", Mapplesborough Green,
Redditch, Worcs. *l.*
- 1927 LAWSON, H. B., "Churchmead," Pirbright, Surrey. *l.*
- 1957 LAWSON, P. H., B.A., "The Mount", Chobham, nr. Woking,
Surrey. *l.*
- 1952 LEECH, M. J., "The Spinney," Freshfield Road, Formby, Nr.
Liverpool. *l, c.*
- 1952 LEES, F. H., F.R.E.S., "The Gables," Maidencombe, Torquay. *l.*
- 1948 LESTON, D., F.Z.S., F.R.E.S., 44, Abbey Road, London, N.W.8.
hem. (Life Member.)
- 1947 LEWIS, E., F.R.E.S., 8, Parry Road, South Norwood, London,
S.E.25. *c.*
- 1951 LING, R. B., The Severells, Rectory Lane, Sidcup, Kent. *l.*
- 1933 LIPSCOME, Maj.-Gen. C. G., H.Q., J.S.L.O., Bonn, Germany. *l.*
- 1937 LISNEY, A. A., M.A., M.B., F.R.E.S., "Dune Gate," Clarence
Road, Dorchester, Dorset. *l.*
- 1948 LLEWELYN, Mrs. J. R., B.SC. (HORT.), F.R.E.S., 38, Fernleigh Rise,
Ditton, Maidstone, Kent. *ent.*
- 1960 LLOYD, D. M., 134, Elgor Avenue, Tolworth, Surbiton, Surrey.
l. c.
- 1948 LOCKINGTON, N. A., M.A., A.R.I.C., 19, Spring Grove, Loughton,
Essex. *ent.*
- 1960 LORIMER, J. A., B.A., M.B., B.CHIR., Roycroft, 23, King's Avenue,
Buckhurst Hill, Essex. *l.*
- 1948 LORIMER, R. I., 8, Southway, Totteridge, N.20. *l.*
- 1950 LOVELL, R., 27, Athenaeum Road, Whetstone, London, N.20. *l.*
- 1959 LUFF, M. L., Flat 3, 8, The Downs, Wimbledon, London, S.W.20.
c.
- 1957 LYGATE-BELL, H. G., 74, Belgrave Avenue, Watford, Herts.
l, orn.
- 1954 LYON, F. H., M.B.E., F.R.E.S., Green Headland, Sampford Peve-
rell, Tiverton, Devon. *l.*
- 1958 McCLEERY, Dr. C. H., 22, Whitwell Way, Coton, Cambridge. *ent.*
- 1953 McCCLURE, A. M., Bowyers Court, Wisborough Green, Sussex. *l.*
- 1952 McCRAE, A. W. R., P.O. Box 41, Kampala, Uganda. *l.*
- 1950 McDERMOTT, Miss C. A., "The Dene," Borough Green, Kent. *rh.*
- 1952 MACKWORTH-PRAED, C. W., F.R.E.S., Castletop, Burley, Hants. *ent.*
- 1960 MACKWORTH-PRAED, H. W., Tunbarr, Headley, Epsom, Surrey. *l.*
- 1949 MACNICOL, D. A. B., M.B., CH.B., 52, St Albans Road, Edinburgh
9. *l. ml.*
- 1931 MACNULTY, B. J., PH.D., B.S.C., F.R.I.C., *Recorder*, 74, High Bridge
Street, Waltham Abbey, Essex. *l.*
- 1956 MAITLAND-SMITH, Capt. GERALD, 2/10 P.M.O., Gurkha Rifles,
Falis, Claremont Road, Claygate, Surrey. *l.*

- 1949 MANLEY, G. E. L., 151, Ebury Street, London, S.W.1. *l*.
- 1945 MANLEY, Lt.-Col. W. B. L., F.R.E.S., Greenways, Shoreham Rd., Otford, Kent. *ent*.
- 1956 MANSELL, G. H., 28 Dorset Road, Merton Park, London, S.W.19. *l*.
- 1932 MARCON, Rev. J. N., Loxwood Vicarage, Billingshurst, Sussex. *l*.
- 1930 MARSH, Capt. DUDLEY G., "White Gates", Wingham Rd., Littlebourne, Nr. Canterbury, Kent. *l*.
- 1956 MARSH, Capt. J. C. S., c/o Lloyds Bank Ltd., Cox's & King's Branch, 6, Pall Mall, S.W.1. *l*.
- 1950 MARTIN, E. L., 35, Goddington Road, Bourne End, Bucks. *l, t*.
- 1922 MASSEE, A. M., O.B.E., D.S.C., F.R.E.S., *Vice-President*, East Malling Research Station, Kent. *hem, c, acarina*.
- 1960 MASURIER, P. LE, Alt na Craig, Aviemore, Inverness-shire. *l, ent*.
- 1959 MATHESON, I. C. C., 109, Alleyn Park, West Dulwich, S.E.21. *l*.
- 1955 MATTHEWS, D. P. L., T.D., Flat 5, 51, Cadogan Place, London, S.W.1. *l*.
- 1947 MAXWELL, Sir REGINALD M., M.A., G.C.I.E., K.C.S.I., Barford House, St Mary Bourne, Andover, Hants. *ent*.
- 1951 MAY, J. T., Homeland, Beech, Alton, Hants. *l*.
- 1946 MELLOWS, CHARLES, Alliot House, The College, Bishop's Stortford, Herts. *l, hym*.
- 1952 MENZIES, I. S., "Eden Roc", Florida Road, Ferring-by-Sea, Sussex. *c, l, orth*.
- 1946 MERE, R. M., F.R.E.S., *Trustee, President*, Mill House, Chiddingfold, Surrey. *l*.
- 1951 MESSENGER, J. L., B.A., *Council*, Stonehaven, Wormley Hill, Witley, Surrey. *l*.
- 1951 MICHAELIS, H. N., 10, Didsbury Park, Didsbury, Manchester 20. *l*.
- 1945 MICHAUD, J., PH.D., 22, Routh Road, London, S.W.18. *ent*.
- 1938 MINNION, W. E., 40, Cannonbury Avenue, Pinner, Middlesex. *l*.
- 1952 MONTGOMERY, Major J. R. P., M.C., 17 Parachute Bn. (9D.L.I.) T.A., Burt Terrace Drill Hall, Gateshead, Co. Durham. *l*.
- 1957 MOON, H. N., 319, Coniscliffe Road, Darlington. *rh*.
- 1946 MOORE, B. P., B.S.C., PH.D., F.R.E.S., C.S.I.R.O. Divn. of Industrial Chemistry, P.O. Box 4331, G.P.O., Melbourne, Victoria, Australia. *od, c*.
- 1947 MOORE, D. R., Manor Cottage, Blackthorne, nr. Bicester, Oxon. *l (Life Member)*.
- 1947 MOPPETT, A. A., B.A., 39, Fairdale Gardens, Hayes, Middlesex. *ent*.
- 1951 MORE, D., The Little House, Hockley Road, Rayleigh, Essex. *ent*.
- 1949 MORGAN, H. D., F.R.E.S., 110 Victoria Avenue, Porthcawl, Glam. *ent*.

ELECTION.

- 1920 MORISON, G. D., B.Sc., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen, Scotland. *ec. ent.*
- 1930 MORLEY, A. M., O.B.E., M.A., F.R.E.S., 9, Radnor Park West, Folkestone, Kent. *l.*
- 1953 MORRIS, M. G., F.R.E.S., *Hon. Curator*, Dungallain Cottage, Oakwood Road, Maidstone, Kent. *l.*
- 1945 MURRAY, Rev. D. P., F.R.E.S., The Lodge, Stoke Golding, Nr. Nuneaton, Leics. *l.*
- 1957 MURRAY, E. G., 22, Evelyn St., Deptford, London, S.E.8. *l.*
- 1960 MYERS, A. A., 34, Crundale Avenue, Kingsbury, London, N.W.9. *l, ec, b.*
- 1949 NEWMAN, D. E., 4, Andrew Road, Wallingford, Berks. *l.*
- 1926 NEWMAN, L. HUGH, F.R.E.S., Betsoms, Westerhorn, Kent. *l.*
- 1950 NEWTON, J., B.Sc., 11, Oxlease Close, Tetbury, Glos. *l.*
- 1945 NEWTON, J. L., M.R.C.S., L.R.C.P., F.R.E.S., 8, Stainburn Crescent, Leeds 17. *l, b.*
- 1930 NIBLETT, M., F.R.E.S., 10, Greenway, Wallington, Surrey. *galls.*
- 1953 NISSEN, C. L., F.R.E.S., Flat 10, 250, South Norwood Hill, London, S.E.25. *l.*
- 1955 NOBLE, F. A., 2, Newton Road, Sparkhill, Birmingham, 11. *l.*
- 1958 NOLDE, W. F., 83, Hazelbank Road, Catford, London, S.E.6. *c.*
- 1938 ODD, D. A., F.Z.S., F.R.E.S., "Herons Ghyll", Stall House Lane, North Heath, Pulborough, Sussex. *l.*
- 1932 O'FARRELL, A. F., B.Sc., A.R.C.S., F.R.E.S., New England University, Armidale, N.S.W., Australia. *od, cr, ent.*
- 1934 OLIVER, G. B., "Corydon", Amersham Road, Hazlemere, High Wycombe, Bucks. *l.*
- 1943 OLIVER, G. H. B., "Corydon", Amersham Road, Hazlemere, High Wycombe, Bucks. *l.*
- 1952 OLSEN, E. T., Hersegade 5, Roskilde, Denmark. *ml.*
- 1945 OWEN, GODFREY V., Orford, 63, Manor Park Road, West Wickham, Kent. *l.*
- 1958 PAINTER, H. L., "Forsters", West Malling, Kent. *l.*
- 1942 PARFITT, R. W., "Penpethy", Manor Rd., Farnborough, Hants. *l.*
- 1946 PARMENTER, L., F.R.E.S., 94, Fairlands Avenue, Thornton Heath, Surrey. *d. (Life Member.)*
- 1949 PARSONS, R. E. R., F.R.E.S., I.P., Woodlands Lodge, Woodlands Close, Ottershaw, Surrey. *l.*
- 1950 PAYNE, J. H., 10, Ranelagh Road, Wellingborough, Northants. *rh, breeding.*
- 1940 PAYNE, R. M., 8, Hill Top, Loughton, Essex. *c, od, orth, b. (Life Member.)*
- 1957 PEARCE, C. J., 2, Head Street, Rowhedge, Colchester, Essex. *ent.*

ELECTION.

- 1955 PEARSON, A. J. R., Dower Cottage, Feering, Colchester, Essex.
rh.
- 1959 PEET, T. N. D., Beaconswood, Rednal, nr. Birmingham. *l.*
- 1940 PELHAM-CLINTON, EDWARD C., F.R.E.S., 34, Craigmillar Park,
Edinburgh, 9. *l.*
- 1958 PENROSE, R. J., 86, Mildred Avenue, Watford, Herts. *ent.*
- 1928 PERKINS, J. F., B.SC., F.R.E.S., 95, Hare Lane, Claygate,
Surrey. *hym.*
- 1944 PERRY, K. M. P., 15, Roundwood Way, Banstead, Surrey. *c.*
- 1950 PETERS, WALLACE, M.B., B.S., M.R.C.S., L.R.C.P., F.R.E.S., 175,
Lauderdale Mansions, London, W.9. *ent, l.*
- 1946 PHELPS, C. C., M.B.E., 4, Queensberry House, Friars Lane, Rich-
mond, Surrey. *l.*
- 1958 PHILLIPS, Miss A., 56, Park Avenue, Maidstone, Kent. *c.*
- 1960 PHILLIPS, A. F., 117, Engadine Street, Southfields, London,
S.W.18. *l.*
- 1958 PHILLIPS, J. H. C., M.A., F.R.C.S., 29, Headlands, Kettering,
Northants. *l.*
- 1945 PHILPOTT, V. W., F.R.E.S., Melcombe Cottage, Broadmayne,
Dorset. *l.*
- 1933 PINNIGER, E. B., F.R.E.S., "Littlecote", 19, Endlebury Road,
Chingford, London, E.4. *od, n, l.*
- 1960 PLANTROU, J. E., 57, Boulevard Murat, Paris 16. *l, rh.*
- 1949 PLATTS, J. H., Green Shutters, Manthorpe Road, Grantham,
Lincs. *l.*
- 1947 POLACEK, V. B., Brandys-nad-Labem, c.p. 601, 1 patro, Komen-
skeho-ulice, Czechoslovakia. *b, ent, orn.*
- 1958 POLLAK, P. M., 5, Matlock Court, Kensington Park Road, Lon-
don, W. 11. *c, arach.*
- 1933 POOLES, S. W. P., 154, Thorpe Road, Peterborough, Northants. *l.*
- 1949 POPHAM, W. J., 89, Frederick Place, Plumstead, London, S.E.18. *l.*
- 1955 POTTER, N. B., The Mill House, North Warnborough, Hants. *l.*
- 1950 PRICE, G. C., "Alpha," 67, Cornyx Lane, Solihull, Warwick-
shire. *l.*
- 1948 PRIDEAUX, A. G., B.A., Union Club, St. James' Street, London,
S.W.1. *ent (rh), orn.*
- 1957 PRING, M., 3, Park Homer Road, Colehill, Wimborne, Dorset. *l.*
- 1945 PUREFOY, J. BAGWELL, c/o Upper Tilt Works, Cobham, Surrey. *l.*
- 1946 RANSOME, Major-General A. L., C.B., D.S.O., M.C., The Close,
Braishfield, Romsey, Hants. *rh.*
- 1955 RAVEN, Rev. Canon C. E., D.D., D.SC., F.B.A., F.L.S., 10, Mad-
ingley Road, Cambridge. *l.*
- 1953 RAWLINGS, C. J., 5, Berther Road, Emerson Park, Hornchurch,
Essex. *l.*
- 1946 RAY, H., Mill House Cottage, Bishopstoke, Hants. *rh.*
- 1960 READ, D. K., 18, Akeman Street, Tring, Herts. *l.*

ELECTION.

- 1955 REDGRAVE, A. C. R., 17, Woods Orchard Road, Tuffley, Gloucester. *l*.
- 1952 REID, J. F., 19, High Street, Leighton Buzzard, Beds. *l*.
- 1950 REID, W., A.M.I.C.E., 6, Whirlow Park Road, Sheffield 11, Yorks. *ent*.
- 1945 RICHARDS, Prof. O. W., M.A., D.SC., F.R.S., F.R.E.S., Department of Zoology, Imperial College of Science and Technology, South Kensington, London, S.W.7. *ent*.
- 1957 RICHARDS, R. F., 25, Bishops Road, Fulham, S.W.6. *l*.
- 1948 RICHARDSON, A. E., 391, Malden Road, Worcester Park, Surrey. *l*.
- 1942 RICHARDSON, AUSTIN, M.A., F.R.E.S., Beaudesert Park, Minchinhampton, Glos. *l*.
- 1936 RICHARDSON, N. A., 11, Windsor Street, Bletchley, Bucks. *l*.
- 1953 RIORDAN, B. D., 75, Blenheim Road, North Harrow, Middlesex. *c*.
- 1953 RIVERS, C. F., F.R.E.S., 98, Windsor Road, Cambridge. *l* (*virus diseases of insects*).
- 1910 ROBERTSON, G. S., M.D., "Struan", Storrington, near Pulborough, Sussex. *l*.
- 1949 ROBINSON, H. S., F.R.E.S., c/o Employees' Provident Fund, Brickfields Road, Kuala Lumpur, Malaya. *l*.
- 1954 ROBINSON, P. J. M., B.SC., A.M.I.C.E., c/o John Mowlem & Co., P.O. Box 1578, Teheran, Iran. *l*.
- 1953 ROCHE, C. G., A.C.A., 80, Princes Gate Mews, London, S.W.7. *hym*.
- 1942 ROCHE, P. J. L., M.R.C.S., L.R.C.P., F.R.E.S., Medical Officer, H.M. Prison, Pentonville, London, N.7. *c, hem, e.l.*
- 1953 ROSE, IAN C., "White Lodge", Mistley, Essex. *ent*.
- 1960 ROWBERRY, D., Loxley House, Maybury Hill, Woking, Surrey. *ent*.
- 1932 RUDLAND, W. LEWIS, F.R.E.S., 452, Hythe Road, Ashford, Kent. *l*.
- 1947 RUMSEY, F., 46, Warren Road, Banstead, Surrey. *l*.
- 1952 RUSSWURM, A. D. A., F.R.E.S., Coridon, Ober Road, Brockenhurst, Hants. *l*.
- 1946 SAUNDBY, Air-Marshal Sir ROBERT H. M. S., K.C.B., K.B.E., M.C., D.F.C., A.F.C., F.R.E.S., Oxleas, Burghclere, near Newbury, Berks. *l*.
- 1947 SAUNDERS, J. M. K., 22, Francis Road, Pinner, Middlesex. *l* (*especially rh*).
- 1958 SAVAGE, L. E., 65, Cranmer Avenue, Hove, 4, Sussex. *l*.
- 1956 SCHOFIELD, Wing Comdr. C. H., Grey Barn, Worth Matravers, Swanage, Dorset. *l, b*.
- 1927 SCOTT, Col. E., D.S.O., M.D., S.B.ST.J., "Suomi," Westwell, Ashford, Kent. *l*.
- 1948 SCULTHORP, A. H., 46, Pick Hill, Waltham Abbey, Essex. *c*.
- 1946 SELF, K. W., 53b, Earls Avenue, Folkestone, Kent. *ent*.
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Reynolds & Co., P/O Box 5026, Mombasa, Kenya. *l*. (*Life Member*).

- 1958 SHARMAN, A. J., Pallavaram P.O., South India. *rh.*
- 1951 SHAW, R. G., 5, Barnham Road, Chingford, London, E.4. *l, hem.*
- 1947 SHORT, H. G., M.Sc., "Leaholme", 8, Milbourne Lane, Esher, Surrey. *l.*
- 1954 SHOWLER, A. J., M.Sc., 19, Harval Crescent, Abbey Wood, London, S.E.2. *l.*
- 1960 SIDE, K. C., 107, London Road, Stone, Dartford, Kent. *c.*
- 1948 SIGGS, L. W., Sungate, Football Green, Minstead, nr. Lyndhurst, Hants. *l.*
- 1939 SIVITER SMITH, P., F.R.E.S., Candlestick House, Heaton Drive, Edgbaston, Birmingham, 15. *l.*
- 1957 SKINNER, B. F., 85, Elder Road, W. Norwood, S.E.27. *l.*
- 1956 SMITH, F. G., Shenstone Lodge, Cokes Lane, Chalfont St. Giles, Bucks. *l.*
- 1941 SMITH, Lieut. FDK. WM., R.N.V.R., South Fawley Cottage, Wantage, Berks. *l, hym. (Life Member).*
- 1946 SOUTHWOOD, T. R. E., B.Sc., PH.D., A.R.C.S., M.I.BIOL., F.R.E.S., Imperial College Field Station, Silwood Park, Sunninghill, Nr. Ascot, Berks. *ent, hem, c, ecology.*
- 1949 SPENCER, K. A., B.A., F.R.E.S., 19, Redington Road, London, N.W.3. *l, d.*
- 1947 SPERRING, A. H., Slindon, Fifth Avenue, Warblington, Hants. *l.*
- 1956 SPOCZYNSKA, Mrs. J. O. I., 89, Harlestone Road, St. James', Northampton. *l.*
- 1943 SPREADBURY, W. H., 3 Sherwood Road, Seaford, Sussex. *nat. hist.*
- 1953 STALLWOOD, B. R., 17 Claremont Avenue, Sunbury-on-Thames, Middlesex. *l.*
- 1949 STANLEY, F. C., F.R.E.S., "Swanmore", Bowes Hill, Rowlands Castle, Hants. *l, c.*
- 1927 STANLEY-SMITH, F., "Hatch House", Pilgrims Hatch, Brentwood, Essex. *l.*
- 1958 STEWART, R. H. A., B.A., Downs House Flat, Highfield, Lympington, Hants. *l.*
- 1942 STIDSTON, Eng. Capt. S. T., R.N., F.R.E.S., "Ashe", Ashburton, Devon. *l.*
- 1955 STOCKLEY, R. E., 18 Leighton Gardens, Sanderstead, Surrey. *l.*
- 1952 STORACE, LUCIANO, Museo Storia Naturale, Via Brigata Liguria, 9, Genoa, Italy. *l.*
- 1924 STOREY, W. H., Fairstead, Long Road, Cambridge. *ent.*
- 1945 STOUTON-HARRIS, G., M.A., F.C.A., F.R.E.S., "Rosegarth", Waldens Road, Horsell, Woking, Surrey. *l.*
- 1948 STRUTHERS, F. M., 143a, Gander Green Lane, Cheam, Surrey. *l.*
- 1929 STUBBS, G. O., Egremont House, Ely, Cambs., and Survey Office, Kuala Lumpur, Malaya.
- 1934 SUTTON, GRESHAM R., 6, Kenilworth Gardens, Loughton, Essex. *l, c.*

- 1960 SWAN, B. M., PH.C., M.P.S., F.R.E.S., 2, Rosemary Road, Bearstead, Maidstone, Kent. *l*.
- 1950 SYMES, H., M.A. (OXON), 52, Lowther Road, Bournemouth, Hants. *l*.
- 1942 TALBOT DE MALAHIDE, THE LORD, C.M.G., Malahide Castle, Dublin, Ireland. *l*.
- 1922 TAMS, W. H. T., F.R.E.S., *Council*, 20, Ranelagh Avenue, Fulham, London, S.W.6. *ent*.
- 1960 TATUM, J. B., B.S.C., 34, Brangwyn Avenue, Brighton, 6, Sussex. *orn, ent*.
- 1950 TAYLOR, A. S., 364, Burley Road, Leeds 4. *l*.
- 1958 TAYLOR, R. C., Vinnicks Cottage, Highclere, nr. Newbury, Berks. *l*.
- 1949 TEMPLE, Miss VERE, F.R.E.S., King's Chase, Tollard Royal, Salisbury, Wilts. *l, hym, orth, od*.
- 1952 THORN, Miss B. A., "Paviott", 16, Springfields, Broxbourne, Herts. *l*.
- 1952 THORNTON, J., 43, Barnes Street, Clayton-le-Moors, Accrington, Lancs. *l*.
- 1950 THORPE-YOUNG, D. W., A.I.A.C., F.Z.S., 11, Waverley Way, Carshalton Beeches, Surrey. *ent*.
- 1956 TIDMARSH, A. C. B., Furze field, West End Lane, Nr. Haslemere, Surrey. *l*.
- 1956 TIDMARSH, J. S. C., Furze field, West End Lane, Nr. Haslemere, Surrey. *l*.
- 1945 TIMMS, C., F.R.E.S., 524a, Moseley Road, Birmingham 12. *d*.
- 1953 TORLESSE, Rear Admiral A. D., C.B., D.S.O., Trentham, Burton Joyce, Notts. *l*.
- 1948 TORSTENIUS, STIG, Foreningsvägen 10, Stocksand, Sweden. *l*.
- 1950 TROUGHT, TREVOR, M.A., F.R.E.S., Brookland, Tysoe, Warwickshire. *l*.
- 1948 TRUNDELL, E. E. J., "Camilla", Bowesden Lane, Shorne Ridgway, Gravesend, Kent. *ent, l*.
- 1948 TUBBS, Mrs M., 9, Lingfield Road, Wimbledon Common, S.W.19. *rh*.
- 1947 TUBBS, R. S., O.B.E., F.R.I.B.A., 9, Lingfield Road, Wimbledon Common, S.W.19. *rh*.
- 1934 TUNSTALL, H. G., 11 St. James Avenue, Ewell, Surrey. *l*.
- 1940 TURNER, A. D., 19, Manor Close, Kingsbury, London, N.W.9. *ent*.
- 1948 TURNER, A. H., F.Z.S., F.R.E.S., F.R.MET.S., Mariarti, Star Lane, North Curry, Taunton, Somerset. *ent, insect migration, conchology. (Life Member)*
- 1944 TURNER, H. J., 4, Browning Avenue, Boscombe, Nr. Bournemouth, Hants. *l*.
- 1953 TWEEDIE, M. W. F., M.A., F.Z.S., *Council*, Barn House, Houghton Green, Rye, Sussex. *l*.
- 1952 UFFEN, R. W. J., F.R.E.S., 4, Vaughan Avenue, Stamford Brook, W.6. *l, hym, d*.

ELECTION.

- 1945 VALENTINE, ARTHUR, Ivey House, West Shepton, Shepton Mallet, Somerset. *ent.*
- 1922 VALLINS, F. T., A.C.I.I., F.R.E.S., *Vice-President*, 4, Tattenham Grove, Tattenham Corner, Epsom, Surrey. *Lycaenidae. (Life Member.)*
- 1951 VARLEY, Prof. G. C., M.A., PH.D., F.R.E.S., F.Z.S., Hope Dept. of Entomology, University Museum, Oxford. *hym, d.*
- 1951 VIETTE, P. E. L., Paris Museum (Entomology), 45 bis, Rue de Buffon, Paris 5, France. *l.*
- 1949 WADE, D., 17, Waldegrave Avenue, Holderness Road, Hull, Yorks. *l, orn.*
- 1929 WAINWRIGHT, CHARLES, B.SC., F.R.I.C., 42, St. Bernards Road, Olton, Warwickshire. *l.*
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 37, Marryat Road, Wimbledon, London, S.W.19. *l.*
- 1947 WAKELY, L. J. D., O.B.E., M.A., Office of the High Commissioner of the United Kingdom, Accra, Ghana. *l.*
- 1930 WAKELY, S., 26, Finsen Road, Ruskin Park, London, S.E.5. *l.*
- 1951 WALKER, D. H., B.SC. (ENG.), A.M.I.C.E., "Bellargus", Elmfield Way, Sanderstead, Surrey. *l.*
- 1953 WALLIS, J. L. P., A.R.I.C.S., C.E. in C. Dept., Admiralty, Chamberlain Way, Pinner, Middx. *ent, l*
- 1959 WALLIS, R. B., 29, Tattenham Grove, Epsom Downs, Surrey. *l.*
- 1935 WALLIS-NORTON, Capt. S. G., 2 Victoria Mansions, Eastbourne, Sussex. *ent. (Life Member.)*
- 1956 WARD, W. J. V., B.A., A.R.C.S.C., "Haslemere", 23, Darlington Road, Stockton-on-Tees, Durham. *l.*
- 1936 WARRIER, R. EVERETT, 99, Braidwood Road, London, S.E.6. *l.*
- 1939 WATKINS, N. A., M.A., F.R.E.S., Soldon, Druid Road, Stoke Bishop, Bristol 9, Glos. *l.*
- 1945 WATKINS, O. G., F.R.E.S., 20, Torr View Avenue, Peverell, Plymouth, Devon. *l, od.*
- 1945 WATSON, R. W., F.R.E.S., "Porcorum", Sandydown, Boldre, nr. Lymington, Hants. *l.*
- 1926 WATTS, W. J., 6, Capel Terrace, Southend-on-Sea, Essex. *c.*
- 1947 WEAL, R. D., 124, Marmion Avenue, South Chingford, London, E.4. *c.*
- 1945 WEBB, HARRY E., F.R.E.S., 20, Audley Road, Hendon, London, N.W.4. *l.*
- 1957 WEBB, N. G. G., Fernshaw, Rockfield Road, Oxted, Surrey. *l.*
- 1945 WEDDELL, B. W., 13, The Halve, Trowbridge, Wilts. *ent.*
- 1953 WEST, B. B., A.R.I.B.A., 37, Cardington Road, Bedford. *l, od.*
- 1947 WEST, B. K., 193, Shepherds Lane, Dartford, Kent.
- 1945 WHEELER, A. S., 26, Ashurst Road, Tadworth, Surrey. *l.*
- 1948 WHICHER, L. S., F.R.E.S., A.I.A.E.E., 6, Chisholm Road, Richmond, Surrey. *c.*

ELECTION.

- 1958 WHITE, G. B., 65, Virginia Road, Thornton Heath, Surrey.
ent, orn.
- 1954 WHITEHEAD, J., 16, Westbourne Arcade, Bournemouth, Hants. *l.*
- 1946 WHITEHORN, K. P., F.R.E.S., "Spindles", Windsor Road, Gravesend, Kent. *l.*
- 1920 WIGHTMAN, A. J., F.R.E.S., 67, The Spinney, Pulborough, Sussex. *l (noctuae).*
- 1958 WILDING, N., 66, Brabourne Rise, Beckenham, Kent.
- 1946 WILDRIDGE, W., "Flavion", Penn Road, Park Street, Nr. St. Albans, Herts. *ent.*
- 1960 WILKINSON, A. D., M.B.O.U., Tynedale, Enton, Godalming, Surrey.
local records; migration.
- 1960 WILLCOX, H. N. A., 19, York Road, Windsor, Berks. *l.*
- 1945 WILLIAMS, E. F., F.R.E.S., The Cottage, Navestockside, Brentwood, Essex. *l.*
- 1957 WILLIAMS, E. O., M.A., F.R.C.S., M.R.C.O.G., "Bonners", Hambledon, Surrey. *l.*
- 1948 WILLIAMS, L. H., PH.D., B.SC., 31, Armour Road, Tilehurst, Reading, Berks. *ent.*
- 1932 WILLIAMS, S. W. C., Lyndore, 27, Colmere Gdns., Hinton Wood Avenue, Highcliffe, Christchurch, Hants. *l.*
- 1951 WOOD, E. F., 18, Nursery Road, Prestwich, near Manchester, Lancs. *l.*
- 1956 WOODWARD, R. J., 65, Valleyfield Road, Streatham, S.W.16. *rh.*
- 1927 WORMS, C. G. M. DE, M.A., PH.D., F.R.I.C., F.R.E.S., M.B.O.U., "Three Oaks", Shore's Road, Horsell, Woking, Surrey.
l, orn.
- 1960 WRAIGHT, C. A., 10 Windermere, Lytton Grove, Putney, London, S.W.15. *l, ent.*
- 1957 WRIGHT, A. E., 9, Albert Court Mansions, Kensington, London, S.W.7. *rh. esp. Satyridae.*
- 1955 WRIGHT, DAVID, Whitehill House, Whitehill, Bordon, Hants. *l.*
- 1949 WRIGHTSON, A. L., 93, Morse Street, Lower Brunshaw, Burnley, Lancs. *l.*
- 1945 WYKES, N. G., Carter House, Eton College, Windsor, Berks. *l.*
- 1957 YANO, J., c/o Iwai & Co., Capel House, 54, New Broad Street, London, E.C.2. *rh.*
- 1945 YODEN, GEORGE H., F.R.E.S., 18, Castle Avenue, Dover, Kent. *l*
- 1950 YOUNG, Miss G. M., 30, Cranley Gardens, Palmers Green, London, N.13. *l.*
- 1952 YOUNG, L. D., c/o 1, Oak Way, off Farm Lane, Ashted, Surrey.
ent.

Members will greatly oblige by informing the Hon. Secretary of any errors in, additions to, or alterations required in the above addresses and descriptions.

Geographical List of Members arranged under Country, County and Town in Alphabetical Order

ENGLAND.

BEDS.

Bedford.

West, B. B.

Leighton Buzzard.

Reid, J. F.

BERKS.

Finchampstead.

Hyde, R. A.

Mortimer.

Easton, N. T.

Newbury.

Saundby, R. H. M. S.

Taylor, R. C.

Reading.

Baker, B. R.

Dolton, H. L.

Williams, L. H.

Sunninghill.

Southwood, T. R. E.

Wallingford.

Newman, D. E.

Wantage.

Smith, F. W.

Windsor.

Halstead, D. G. H.

Willcox, H. N. A.

Wykes, N. G.

BUCKS.

Beaconsfield.

Carter, W. A. C.

Bletchley.

Kershaw, S. H.

Richardson, N. A.

Bourne End.

Martin, E. L.

Chalfont St. Giles.

Smith, F. G.

Chalfont St. Peter.

Ansorge, E.

High Wycombe.

Oliver, G. B.

Oliver, G. H. B.

Newport Pagnell.

Cripps, C. H.

CAMBS.

Cambridge.

Carter, R. A.

Gardiner, B. O. C.

McCleery, C. H.

Raven, C. E.

Rivers, C. F.

Storey, W. H.

Ely.

Harvey, J. G.

Wisbech.

Elgood, W. S.

CHESHIRE.

Caldy.

Clarke, C. A.

Nantwich.

Boyes, J. D. C.

Northwich.

Crewdson, R. C. R.

Stockport.

Kloet, G. S.

Wirral.

Hardy, D. E.

CORNWALL.

St. Just.

Gyselman, Y. P.

CUMBERLAND.

Brampton.

Johnson, G. F.

Penrith.

Davidson, W. F.

Hervey, G. A. K.

DERBYSHIRE.

Shardlow.

Cooper, B. A.

DEVON.

Ashburton.

Kennard, H. A.

Stidston, S. T.

Exminster.

Bliss, A.

Bishops Teignton.

Coleridge, W. L.

Exeter.

Feilden, G. S. C. C.

Plymouth.

Watkins, O. G.

Sampford Peverell.

Lyon, F. H.

Torquay.

Lees, F. H.

Totnes.

Atkinson, J. L.

DORSET.

Broadmayne.

Philpott, V. W.

Charmouth.

Goodden, R. C.

Dorchester.

Lisney, A. A.

Wimborne.

Bing, M.

Worth Matravers.

Schofield, C. H.

DURHAM.

Chester-le-Street.

Dunn, T. C.

Darlington.

Moon, H. N.

Gateshead.

Montgomery, J. R. P.

Stockton-on-Tees.

Ward, W. J. V.

Sunderland.

Jefferson, T. W.

ESSEX.

Brentwood.

Stanley-Smith, F.

Williams, E. F.

Buckhurst Hill.

Lorimer, J. A.

Colchester.

Blaxill, A. D.

Firmin, J.

Pearce, C. J.

Pearson, A. J. R.

Harlow.

Forster, H. W.

Hornchurch.

Rawlings, C. J.

Loughton.

Lockington, N. A.

Payne, R. M.

Sutton, G. R.

Mistley.

Rose, I. C.

Rayleigh.

More, D.

Shenfield.

Friedlein, A. F. E.

Southend-on-Sea.

Watts, W. J.

Southminster.

Dewick, A. J.

Thorpe Bay.

Johnson, F. L.

Waltham Abbey.

MacNulty, B. J.

Sculthorp, A. H.

Westcliff-on-Sea.

Huggins, H. C.

GLOS.

Bristol.

Bell, C. L.

Campbell, A. M. L.

Hinton, H. E.

Watkins, N. A.

Dursley.

Cross, D. J.

Gloucester.

Redgrave, A. C. R.

Minchinhampton.

Richardson, A.

Stroud.

Demuth, R. P.

Tetbury.

Newton, J.

HANTS.

Alton.

May, J. T.

Andover.

Maxwell, R. M.

Basingstoke.

Goodliffe, F. D.

Bishopstoke.

Ray, H.

Bordon.

Wright, D.

Bournemouth.

Curtis, W. P.

Fraser, F. C.

Symes, H.

Turner, H. J.

Whitehead, J.

Brockenhurst.

Burgess, L. W.

Russwurm, A. D. A.

Burley.

Mackworth-Praed, C. W.

Christchurch.

Barton, B. C.

Williams, S. W. C.

Fareham.

Burns, B. S.

Farnborough.

Parfitt, R. W.

Fordingbridge.

Burton, P. J.

Lee-on-Solent.

Downes, A. S.

Liss.

Brooke, W. M. A.

Lymington.

Farwell, I. G.

Stewart, R. H. A.

Micheldever.

Dixon, C. H.

Minstead.

Siggs, L. W.

North Warnborough.

Potter, N. B.

Portsmouth.

Langmaid, J. R.

Romsey.

Ransome, A. L.

Rowlands Castle.

Stanley, F. C.

St. Ives.

Dollimore, G. F.

Sandydown.

Watson, R. W.

Warblington.

Sperring, A. H.

Winchester.

Blyth, S. F. P.

ffennell, D. W. H.

HERE.

Ross-on-Wye.

Knight, J. E.

HERTS.

Arkley.

Howarth, H.

Howarth, T. G.

Barnet.

Calderara, P.

Bishop's Stortford.

Allan, P. B. M.

Ashwell, D. A.

Craufurd, C.

Mellows, C.

Broxbourne.

Thorn, B. A.

Harpenden.

Crow, P. N.

Redbourn.

Bowden, S. R.

St. Albans.

Byers, F. W.

Edwards, G. G.

Wildridge, W.

Tring.

Goodson, A. L.

Read, D. K.

Watford.

Lydgate-Bell, H. G.

Penrose, R. J.

I. OF WIGHT.

Freshwater.

Knill-Jones, R. P.

KENT.

Ashford.

Cue, P.

Duffield, C. A. W.

Rudland, W. L.

Scott, E.

Aylesford.

Davis, G. A. N

Beckenham.

Lane, A. W.

Wilding, N.

Bexley.

Ford, L. T.

Ford, R. L. E.

Borough Green.

McDermott, C. A

Boxley.

Frazer, J. F. D.

Broadstairs.

Harbottle, A. H. H

Bromley.

Cox, W. A. A.

Jacobs, S. N A

Dartford.

Hare, E. J.

Side, K. C.

West, B. K.

Ditton.

Llewelyn, J. R.

Dover.

Youden, G. H.

East Malling.

Massee, A. M.

Folkestone.

Morley, A. M.

Self, K. W.

Gravesend.

Trundell, E. E. J.

Whitehorn, K. P

Littlebourne.

Marsh, D. G.

Maidstone.

Jenner, D.

Morris, M. G.

Phillips, A.

Swan, B. M.

Orpington.

Gowing-Scopes, E

Otford.

Manley, W. B. L.

Ramsgate.

Lanfear, A. H.

<i>Sevenoaks.</i>	E.7.	<i>Forest Gate.</i>
Busbridge, W. E.		Baxter, L. N.
Coxon, G. F.		Baxter, R. N.
<i>Sidcup.</i>	E.11.	<i>Wanstead.</i>
Ling, R. B.		Butterfield, A. W.
<i>St. Mary Cray.</i>		Syms, E. E.
Chatelain, R. G.	E.C.2.	<i>City.</i>
<i>Tunstall</i>		Yano, J.
Allen, P. V. M.	N.1.	<i>Canonbury</i>
<i>Westerham.</i>		Bradford, E. S.
Edwards, R. C.		Buck, F. D.
Newman, L. H.	N.3.	<i>Finchley.</i>
<i>West Malling.</i>		Griffiths, G. C. D.
Painter, H. L.	N.6.	<i>Highgate.</i>
<i>West Wickham.</i>		Ebbage, I.
Chalmers-Hunt, J. M.	N.7.	<i>Pentonville.</i>
Owen, G. V.		Roche, P. J. L.
<i>Wilmington.</i>	N.12.	<i>Finchley.</i>
Honeybourne, T. J.		Cross, G. S. E.
	N.13.	<i>Palmers Green.</i>
LANCS.		Young, G. M.
<i>Accrington.</i>	N.20.	<i>Whetstone.</i>
Thornton, J.		Lorimer, R. I.
<i>Blackburn.</i>		Lovell, R.
Bryce, D.	N.W.1.	<i>Regent's Park.</i>
<i>Bolton.</i>		Hemming, A. F.
Coxey, S.	N.W.3.	<i>Hampstead.</i>
<i>Burnley.</i>		Harrison-Gray, M.
Wrightson, A. I.		Keith-Johnston, C.
<i>Formby.</i>		Spencer, K. A.
Leech, M. J.	N.W.4.	<i>Hendon.</i>
<i>Grange-over-Sands.</i>		Webb, H. E.
Heath, J.	N.W.6.	<i>Hampstead.</i>
<i>Manchester.</i>		Hillaby, J. D.
Michaelis, H. N.	N.W.7.	<i>Mill Hill.</i>
Wood, E. F.		Goater, B.
<i>Southport.</i>		Howard, A. P.
Greenwood, K. C.	N.W.8.	<i>Regent's Park.</i>
		Ashby, G. J.
LEICESTERSHIRE.		Leston, D.
<i>Market Harborough.</i>	N.W.9.	<i>Kingsbury.</i>
Buckler, H. A.		Myers, A. A.
<i>Stoke Golding.</i>		Turner, A. D.
Murray, D. P.		
LINCS.	S.E.2.	<i>Abbey Wood.</i>
<i>Grantham.</i>		Showler, A. J.
Platts, J. H.	S.E.3.	<i>Blackheath.</i>
<i>Grimsby.</i>		Ashby, F. A.
Jeffs, G. A. T.		Gould, A. W.
<i>Market Rasen.</i>	S.E.4.	
Court, T. H.		Hammond, N.
<i>Scunthorpe.</i>	S.E.5.	<i>Ruskin Park.</i>
Gooseman, M. P.		Wakely, S.
	S.E.6.	<i>Catford.</i>
		Nolde, W. F.
		Warrier, R. E.
LONDON.	S.E.8.	<i>Deptford.</i>
E.4.		Murray, E. G.
<i>Chingford.</i>	S.E.9.	Cramp, A. C.
Pinniger, E. B.		
Shaw, R. G.		
Weal, R. D.		

- S.E.18. *Plumstead.*
Hards, C. H.
Popham, W. J.
- S.E.21. *Dulwich.*
Aston, A. E.
Dillon, T. J.
Matheson, I. C. C.
- S.E.23. *Forest Hill.*
Cornelius, J. A.
Cramp, J. K.
- S.E.24. *Herne Hill.*
Imber, S. F.
- S.E.25. *South Norwood.*
Lewis, E.
Nissen, C. L.
- S.E.27. *W. Norwood.*
Skinner, B. F.
- S.W.1. *Westminster.*
Bridges, H. C.
Manley, G. E. L.
Marsh, J. C. S.
Matthews, D. P. L.
Prideaux, A. G.
- S.W.6. *Fulham.*
Richards, R. F.
Tams, W. H. T.
- S.W.7. *S. Kensington.*
Evans, E.
Hocking, S. K.
Richards, O. W.
Roche, C. G.
Wright, A. E.
- S.W.13. *Barnes.*
Hodgkinson, A.
- S.W.15. *Putney.*
Wraight, C. A.
- S.W.16. *Streatham.*
Christie, J.
Christie, L.
Woodward, R. J.
- S.W.17. *Tooting.*
Allen, D. M.
- S.W.18. *Wandsworth.*
Hall, D. G.
Michaud, J.
- S.W.19. *Wimbledon.*
Dacie, J. V.
Hawkins, C. N.
Mansell, G. H.
Riley, N. D.
Tubbs, M.
Tubbs, R. S.
Wakely, L. D.
- S.W.20. *Merton Park.*
Coulson, F. J.
Luff, M. L.
- W.6. *Hammersmith.*
Uffen, R. W. J.

- W.8. *Kensington.*
Craske, R. M.
- W.9. *Maida Hill.*
Peters, W.
- W.11. *Notting Hill.*
Pollak, P. M.
- W.C.1. *Holborn.*
Janson, D. B.

MIDDLESEX.

- Eastcote.*
Goodban, B. S.
- Enfield.*
Eagles, T. R.
- Harrow.*
Riordan, B. D.
- Hayes.*
Moppett, A. A.
- Hounslow.*
Gerard, B. McC.
- Isleworth.*
Bradley, J. D.
Classey, E. W.
Hanson, S. M.
- Pinner.*
Minnion, W. E.
Saunders, J. M. K.
Wallis, J. L. P.
- Ruislip.*
Alford, D. V.
- Stanmore.*
Harris, W. H. A.
- Sunbury*
Stallwood, B. R.
- Teddington.*
Ferguson, L. F.

NORTHANTS.

- Kettering.*
Phillips, J. H. C.
- Northampton.*
Spoczynska, J. O. I.
- Peterborough.*
Pooles, S. W. P.
- Roads.*
Humphrey, S. W.
- Wellingborough.*
Gent, P. J.
Payne, J. H.

NOTTS.

- Burton Joyce.*
Torlesse, A. D.

OXFORDSHIRE.

- Blackthorne.*
Moore, D. R.
- Oxford.*
Bailey, K. E. J.
Ford, E. B.

Kettlewell, H. B. D.
Varley, G. C.

SOMERSET

Burnham-on-Sea.
Heslop, E. A.
Heslop, I. R. P.
Frome.
Cruftwell, G. H. W.
Taunton.
Turner, A. H.
Weston-super-Mare.
Blathwayt, C. S. H.
West Shepton.
Valentine A.

SUFFOLK.

Ipswich.
Barham, C. S.
Beaufoy, S.
Jacoby, M. C.
Stowmarket.
Chipperfield, H. E.

SURREY

Addiscombe.
Bush, D. J. B.
Ashtead.
Young, L. D.
Banstead.
Gardner, A. E.
Last, H. R.
Perry, K. M. P.
Runsey, F.
Bookham.
Brush, H. J.
Carshalton.
Groves, E. W.
Carshalton Beeches.
Thorpe-Young, D. W.
Cheam.
Danby, G. C.
Struthers, F. M.
Chiddingfold.
Mere, R. M.
Chipstead.
Bolton, E. L.
Chobham.
Lawson, P. H.
Churt.
Baker, J. A.
Claygate.
Maitland-Smith, G.
Perkins, J. F.
Clevedon.
Bird, H. W.
Cobham.
Purefoy, J. B.

Coulsdon.
Denvil, H. G.
Ferrier, W. J.
Coulsdon (Old).
Britten, H.
Cranleigh.
Collier, A. E
Dorking.
Cole, G. A.
Haynes, R. F.
Howard, J. O. T.
Epsom.
Lane, C. F.
Mackworth Praed, H. W.
Vallins, F. T.
Wallis, R. B.
Esher.
Brett, G. A.
Ennis, L. H.
Short, H. G
Ewell.
Baker, D. B.
Tunstall, H. G.
Fetcham.
Hickin, N. E.
Frensham.
Gurdon, J. B
Godalming.
Wilkinson, A. D.
Guildford.
Garland, W. A
Hambledon.
Williams E. O.
Haslemere.
Blockey, P. S.
Clegg, J.
Tidmarsh, A. C. B.
Tidmarsh, J. S. C.
Leigh.
Fairclough, R.
Ottershaw.
Bretherton, R. F
Parsons, R. E. R
Oxted.
Webb, N. G. G
Pirbright.
Lawson, H. B
Purley.
Henderson, J. L
Richmond.
Phelps, C. C.
Whicher, L. S
Sanderstead.
Stockley, R. E.
Walker, D. H
Selsdon.
Foster, T. B
Stoneleigh.
Hutchings, H. R

Sutton.

Bolingbroke & St. John
Frohawke, M. J.

Tadworth.

Wheeler, A. S.

Thornton Heath.

Parmenter, L.
White, G. B.

Wallington.

Brown, F. C.
Niblett, M.

Weybridge.

Beesley, W. N.
Best, A. A.

Willey.

Messenger, J. L.

Woking.

Greenwood, J. A. C.
Rowberry, D.
Stoughton-Harris, G.
Worms, C. G. M. de.

Worcester Park.

Alston, H. W. E.
Friend, M. J.
Hyde-Wyatt, B.
Richardson, A. E.

SUSSEX.

Arundel.

Haggett, G. M.

Billingshurst.

Curtis, A. E.
Marcon, J. N.

Bognor Regis.

Clark, J.
Jarvis, F. V. L.

Brighton.

Banner, J. V.
Dyson, R. C.
Tatum, J. B.

Chichester.

Boyce, B.

Eastbourne.

Wallis-Norton, S. G.

East Preston.

Higgins, W. J.

Ferring-by-Sea.

Menzies, I. S.

Hastings.

Astbury, C. F.
Homer, T. J. G.

Horsted Keynes.

Hoare-Ward, J. W.

Littlehampton.

Jay, E. P.

Midhurst.

Agassiz, D. J. L.

Newick.

Embry, B.

Pulborough.

Odd, D. A.
Robertson, G. S.
Wightman, A. J.

Ringmer.

Gully, J. G.

Rye.

Tweedie, M. W. F.

Seaford.

Spreadbury, W. H.

Wisborough Green.

McClure, A. M.

Worthing.

Edwards, F. H.
Langton, P. H.

WARWICKSHIRE.

Birmingham.

Blunt, W. H.
Bowater, W.
Cadbury, E. B.
Evans, L. J.
Hammond, H. E.
Noble, F. A.
Peet, T. N. D.
Siviter Smith, P.
Timms, C.

Olton.

Wainwright, C.

Solihull.

Allen, D.
Carlter, S. E. W.
Edmonds, M. H.
Price, G. C.

Tysoe.

Trought, T.

WESTMORLAND.

Kendal.

Birkett, N. L.

WILTS.

Salisbury.

Temple, V.

Shrewton.

Gillman, H. C. R.

Trowbridge.

Weddell, B. W.

Warminster.

Jackson, R. A.

WORCESTERSHIRE.

Redditch.

Latham, F. H.

Stanton.

Burton, R. J.

YORKS.

Bradford.
 Haxby, C. R.
Doncaster.
 Hyde, G. E.
Dronfield.
 Fearnheough, T. D
Hull.
 Wade, L.

Leeds.

Newton, J. L.
 Taylor, A. S.

Sheffield.

Reid, W.

Shipley.

Hewson, F.
 Kemp, J. K. C.

IRELAND.

CO. DUBLIN

Dublin.
 Talbot de Malahide.

Glenageary.

Baynes, E. S. A.

SCOTLAND.

ABERDEENSHIRE.

Aberdeen.
 Morison, G. D.

DUMFRIES-SHIRE.

Collin.
 Balfour-Browne, W. A. F.
Dumfries.
 Cunningham, D.

FIFE.

St. Andrews.
 Jackson, D. J.

INVERNESS-SHIRE.

Aviemore.
 Masurier, P. le
Newtonmore.
 Harper, G. W.
 Harper, M. W.

MIDLOTHIAN.

Edinburgh.
 Macnicol, D. A. B.
 Pelham-Clinton, E. C.

WALES.

FLINTSHIRE.

Rhuddlan.
 Ives, D. H.

GLAMORGAN.

Cardiff.
 Hurworth, P.
Porthcawl.
 Morgan, H. D.

ABROAD.

EUROPE.

Austria.
 Klimesch, J.
Czechoslovakia.
 Polacek, V. B.
Denmark.
 Carolsfeld-Krause, A. G.
 Olsen, E. T.
France.
 Herbulot, C.
 Plantrou, J. E.
 Viette, P. E. L.
Germany.
 Lipscomb, C. G.
Italy.
 Storace, L.
Sweden.
 Torstenius, S.

AFRICA.

Ghana.
 Wakely, L. J. D.
Kenya.
 Sevastopulo, D. G.
Rhodesia.
 Akester, W. J.
 Daly, D. W.
Tanganyika.
 Dudbridge, B. J.
Uganda.
 McCrae, A. W. R.

AMERICA.

Argentina.
 Hayward, K. J.
Connecticut (U.S.A.)
 Gifford, W. S.
New York (U.S.A.)
 Klots, A. B.

ASIA.

Hong Kong.

Burkhardt, V. R.

India.

Sharman, A. J.

Iran.

Robinson, P J M

Japan.

Asahina, S

Malaya.

Robinson, H. S

Stubbs. G. C

AUSTRALIA

New South Wales

O'Farrell, A F

Tasmania

Couchman, L E

Victoria

Moore, B P

Hall, S. S

COUNCIL'S REPORT FOR 1959

Were it not for the small drop in membership your Council would be able to report another satisfactory year. The membership has fallen slightly; the total stood at 489 on the 31st December 1959, and comprised two Honorary, four Special Life, 15 Life, 214 Ordinary and 254 Country Members. Nine members died during the year. Some of them regularly attended our meetings, and will be sadly missed. Mr. R. Eldon Ellison was a serving member of Council; Messrs. D. A. Hawgood and H. D. Swain were well known at Pepys House; and Mr. F. T. Grant was an Honorary Member of the Society. The others who died were Dr. G. V. Bull, Messrs. R. A. Fraser, H. V. Line, A. W. Richards and E. J. Summers. Seventeen new members joined the Society in 1959, 14 resigned and nine whose subscriptions were overdue were struck off.

Mr. T. R. Eagles was made an Honorary Member on 10th September, in recognition of his many years of service to the Society.

At a Special Meeting of the Society, Mr. R. M. Mere, who had agreed to become one of the Society's Trustees, was duly appointed.

During the year the Society received bequests of £250 from Mr. W. Rait-Smith and £100 from Mr. Hawgood. Dr. Bull bequeathed his collection to the Society.

The Proceedings and Transactions for 1958 were published in October, and consist of xlv + 158 pages, nine plates (two coloured) and 23 text figures. The coloured plates illustrate Part III of Mr. G. Haggett's *Larvae of the British Lepidoptera not figured by Buckler*.

Your Council gratefully acknowledges the receipt, through The Royal Society, of a Parliamentary grant-in-aid of £100 towards the cost of production.

It was decided to hold an Annual Dinner again in 1959, after a lapse of two years. The event took place at the Grosvenor Hotel, Victoria, on Friday, 30th October, and was attended by 60 members and their guests. A most enjoyable evening was spent in pleasant surroundings.

The Annual Exhibition at Burlington House was held on the following day, and once again the exhibits were of a high standard. The subject for special attention, *Apatetic and Sematic Coloration in insects and other groups*, did not draw great response, and it was felt afterwards that too little notice of this specialised subject had been given to members, so that they did not have time to prepare a suitable exhibit. It has been decided in future to indicate the subject for special attention on the programme card. Messrs. W. H. T. Tams and T. G. Howarth attended to the photography of exhibits for illustration in the Proceedings, and we are most grateful to them. The attendance register was signed by 315 members and visitors.

Twenty-one ordinary meetings were held during the year in the rooms of the Junior Institution of Engineers, and again your Council

records with gratitude the efforts of the members of their staff in seeing to our requirements. In particular, the care with which our cabinets and bookshelves have been kept free from dust has been noticed. Mr. Howarth is particularly thanked for the interesting programme he arranged for us. We were pleased to welcome Dr. C. L. Remington from Yale University, who gave a fascinating lecture on European and North American Lepidoptera.

Mr. R. W. J. Uffen arranged a full programme of field meetings which included expeditions to a large number of different types of habitat within reach of London. In spite of the wonderfully fine summer, few members availed themselves of the facilities provided, and the number attending field meetings averaged less than a dozen. Thanks are again extended to Mrs. Odd, who provided tea after the Pulborough meeting. Twenty-seven meetings were held.

It was decided that the Society would produce its own Christmas Card, and members were invited to submit drawings from which a selection would be made. The response was negligible, though some very beautiful drawings were offered by Mr. M. W. F. Tweedie, one of which was chosen for the card. Your Council wishes to thank Mr. Tweedie and also Mr. P. Siviter Smith, who not only made all the arrangements for the production of the card, but himself presented the block to the Society. Miss Jane Goater is also thanked for attending the Annual Exhibition as a visitor and spending the whole day selling Christmas Cards for the Society.

The Honorary Curator reports that the Leston Collection of British Hemiptera has been received. Thanks to the efforts of his Assistants, a cabinet has been prepared to receive this valuable addition to the Society's Collection. Other noteworthy additions are a large collection of many rare and local lepidopterous larvae presented by Mr. G. M. Haggett and some rare Lepidoptera from the collection of the late Dr. G. V. Bull.

During the year many duplicates have been distributed to members, and material has been made available on loan to specialists in Coleoptera.

The following members have presented specimens: Miss C. A. McDermott (Lepidoptera); Messrs. F. D. Buck (Coleoptera); L. Christie (Lepidoptera); A. E. Gardner (Coleoptera); B. Goater (Lepidoptera); J. L. Henderson (Coleoptera); and R. M. Mere (Lepidoptera). The thanks of the Society are due to these members for the valuable additions to our collections.

It is with sincere regret that your Curator finds that, owing to business commitments, he is unable to continue to look after the Society's Collections. We are fortunate in having the services of Mr. M. G. Morris, a capable and hard working member, to take over these duties. He is fully equipped to tackle any of the tasks which may lie before him.

The Society is starting a collection of 2" x 2" colour transparencies of natural history subjects. The loan of members' own transparencies would be most welcome, so that copies could be made (at the Society's

expense) of those slides which the Council selects for the collection. Members will be able to borrow from the collection, and use the slides at outside lectures provided no charge is made for admittance.

The Honorary Librarian reports that during 1959 further substantial progress has been made with the binding of overseas periodicals. Indeed Mr. Vallins has pushed on so well that the end seems to be in sight, as regards back numbers. The card index of authors has been completely revised and brought up-to-date. Moreover a separate card index of subjects has now been made and is available for use.

Our member, Mr. Niblett, has generously presented an important work in two volumes, *Les Cynipides* by J. J. Kieffer. Another member, Mr. S. N. A. Jacobs, has kindly obtained for us the first three fascicles of *Alexanor*, the new French magazine dealing with Lepidoptera and replacing *Revue Française de Lépidoptérologie*.

The Society has been given, by Mr. A. S. Wheeler, a copy of D. Lack's book, *Evolutionary Theory and Christian Belief, The Unresolved Conflict*.

La Société entomologique suisse has sent us volume 1 of *Insecta Helvetica*. The title is *Plecoptera*, and it is in French.

From the respective publishers we have received for review *Bumblebees* by John B. Free and Colin G. Butler, Number 40 of the New Naturalist Series (Collins); *A Guide to the study of Lichens* by Ursula K. Duncan (Buncle); *Excursion Flora of the British Isles* by A. R. Clapham, J. G. Tutin and E. F. Warburg (Cambridge University Press); *Key to the Names of British Butterflies and Moths* by R. D. Macleod (Pitman), and *Land and Water Bugs of the British Isles* by T. R. E. Southwood and Dennis Leston (Warne). This last work is of special interest to us because not only are the authors both members of our Society but the coloured plates are by our late member Mr. H. D. Swain.

The expenditure on binding having been somewhat heavy, it is perhaps fortunate that not much has had to be spent on the purchase of books. Two more of the *Handbooks for the identification of British Insects* published by the Royal Entomological Society of London have appeared. These cover the three small orders, Mecoptera, Megaloptera and Neuroptera, in one of the books, and a further section of the Ichneumonidae in the other. A small but up-to-date book, *A Handbook of Mushrooms*, by Pilat and Usak has been acquired. It is a translation of the Czechoslovak book and it deals with 94 species of mushrooms and toadstools, most of which are found in Britain. The Society has also purchased *Beetles of the British Isles* (2 vols.) by E. F. Linssen, *The World of Spiders* by W. S. Bristowe and *Typical Flies, a Photographic Atlas of Diptera* (3 series) by E. K. Pearce. Lastly, we have bought an item in English from *Acta Zoologica Cracoviensis*, "The Mines of Lepidoptera in *Cornus sanguinea* L. leaves with the particular consideration of mines and development of *Incurvaria oehlmanniella* Treits". The author is Adam Dziursynski.

We continue to receive the following: *Entomologist*; *Entomologist's Monthly Magazine*; *Entomologist's Record*; *Entomologist's Gazette*; *Proceedings and Transactions, Royal Entomological Society of London*; *Journal and Transactions, Society for British Entomology*; *Canadian Entomologist*; *Entomological News*; *Tijdschrift voor Entomologie*; *Opuscula Entomologica*; *Zoologiska Bidrag*; *Mitteilungen der Münchener entomologischen Gesellschaft*; *Beiträge zur Entomologie*; *Lloydia*; *Transactions, Wisconsin Academy of Science*; *Proceedings of the Iowa Academy of Science*; *Fieldiana (Zoology)*; *Bulletin et Annales de la Société Royale de Belgique*; *Essex Naturalist*; *London Naturalist and Bird Report*; *Proceedings, Isle of Wight Natural History Society*; *Proceedings, Lincolnshire Naturalist's Union*; *Transactions, Norfolk and Norwich Naturalist's Society*; *Natural History, New York*; *Smithsonian Institute Reports*; *Annali Museo Civico di Storia Naturale, Genova*; *Doriana*; *Tulane Studies in Zoology*; *Beiträge zur naturkundlichen Forschung in Sudwestdeutschland*; *Bulletin et Annales de la Société Entomologique de France*; *Annalen des Naturhistorischen Museums in Wien*; *Nachrichtenblatt der Bayerischen Entomologen*; *Fragmenta Entomologica*; *Bolletino Inst. Ent. Bologna*; *Bolletino del Laboratorio di entomologica agraria*.

TREASURER'S REPORT for 1959

I am glad to say the Accounts show an even better result than we have had for several years, and we have lived well within our income for the year.

CAPITAL ACCOUNT.

In addition to the legacy of £250 from the late W. Rait-Smith, which we had heard about just before I made my report last year, the Society received a bequest of £100 from the late D. A. Hawgood.

BALANCE-SHEET.

£350 in 5% Defence Bonds, added to our securities, reflects the new Capital acquired during the year. Our investments will now bring in £134 in a full year.

LIBRARY FUND.

Donations from Members for the purpose of binding current periodicals amounted to £12 6s 6d, a little less than the year before because the contributors are not asked for the money promised until the work has been done. The transfer needed from Revenue to keep the balance in this Fund level was £40 less than in 1958.

PUBLICATION FUND.

The cost of producing the "Proceedings" is estimated to be £474 for the 1958 issue. One of the accounts has not yet been rendered. This figure is £104 less than we spent on the 1957 issue. It was found necessary to curtail the number of coloured plates from three to two, but there are two extra monochrome plates and more text figures.

To meet this expense, £330 was transferred from Revenue, the Royal Society again helped with a most welcome contribution of £100 from the Parliamentary Grant in Aid, and the proceeds of sales of publications, War Loan interest, and donations covered the rest.

INCOME AND EXPENDITURE ACCOUNT.

While our general expenses have varied very little indeed for the last three years, this year the income has been higher. Subscriptions received, current and arrears, are £30 more than in the previous year, although the membership has declined by 15 on balance.

After the transfers to Library and Publications Funds and allowing for all expenses, there is a surplus of income over expenditure for the year of £72 7s 6d.

I much regretted being unable to attend the Annual Meeting myself, owing to indisposition, and am glad to record my thanks to Mr. Eagles for reading and explaining the Accounts at very short notice. I am sure he did so most ably.

BALANCE-SHEET at 31st December 1959.

[illegible]

Audited and found correct,
R. M. MERE,
G. STOUGHTON
28th January 1960.

J. L. HENDERSON, Hon. Treasurer.

INCOME AND EXPENDITURE ACCOUNT—Year ended 31st December 1959.

Rent of Rooms, etc.	...	...	£144	1	0
Insurance	...	...	6	14	6
Gratuities	...	...	3	3	6
Secretarial Expenses	...	...	60	6	9
Treasurer's Expenses	...	...	11	18	9
					£226 4 6
Subscriptions to Wicken Fen Fund, Footpaths Preservation Society, Ramblers' Association, National Trust, Field Studies Council and the Conservators of Oxshott Heath	...	...	...	...	7 11 6
Annual Exhibition and Annual Dinner Expenses	...	...	...	...	13 10 6
Grant to Publication Fund	...	...	...	...	330 0 0
Grant to Library Fund	...	...	...	...	65 0 0
Balance being Excess of Income over Expenditure for the year, carried to Balance-Sheet ...					72 7 6
					£714 14 0

Subscriptions (arrears and current) Interest—	...	...	...	...	£595 7 0
£591 15s 3d 3½% Conversion Stock	...	...	...	£20 14 2	
£600 0s 0d 2½% Consolidated Stock	...	...	...	15 0 0	
£850 0s 0d 4% Consolidated Stock	...	...	...	34 0 0	
£500 0s 0d 4½% Defence Bonds	...	...	...	22 10 0	
£400 0s 0d 3½% War Stock	...	...	...	14 0 0	
£350 0s 0d 5% Defence Bonds	...	...	...	2 18 10	
Deposit Interest	...	...	...	10 4 0	
					119 7 0

CAPITAL ACCOUNT—Year ended 31st December 1959.

[illegible]

LIBRARY FUND—Year ended 31st December 1959.

Purchases—				Balance at 1st January 1959	£108 15 8
Books, etc.	.. .. .	£24 8 10	Entrance Fees .. .. .	... .. .	... .. .
Binding	.. .. .	67 13 0	Donations for Binding ... .. .	... .. .	£6 7 6
Repairs to Furniture	.. .. .	0 15 0	Sale of Surplus Volume ... .. .	... .. .	12 16 6
			Grant from Current Income	... .. .	3 0 0
				... .. .	65 0 0
Balance at 31st December 1959 .. .. .	... .. .	103 2 10			87 4 0
					£195 19 8

PUBLICATION FUND—Year ended 31st December 1959.

Printing and Posting the "Proceedings and Transactions", 1958	...	£343 15 0	...	...	...	£3 19 4
Blocks and Printing—						
Coloured Plates	...	104 2 8	...	...	...
Half-tone and Line Plates	...	26 2 9	...	...	...
		£474 0 5				57 5 5
Printing the Supplement to "A Guide to the Smaller British Lepidoptera" by L. T. Ford						
Printing Christmas Card designed by M. W. F.						
Tweedie	...	...	...	...	...	10 10 0
Balance at 31st December 1959	...	...	...	...	...	0 19 0
		25 4 5				100 0 0
		3 16 0				330 0 0
						27 11 0
		£530 4 9				£530 4 9
Balance at 1st January 1959	...	...	...	...	...
Sales of "Proceedings"	...	...	...	...	...	£6 19 9
Sales of Separates	...	...	...	...	...	24 4 0
Sales of "A Guide to the Smaller British Lepidoptera" and Supplement	...	...	...	...	...	26 1 8
Interest—£300 0s 0d War Stock (the Misses E. F. and L. M. Chapman)	...	...	...	...	...
Donations	...	...	...	...	...
Grant-in-Aid from Royal Society	...	...	...	...	...
Grant from Current Income	...	...	...	...	...
Sales of Christmas Cards	...	...	...	...	...



F. T. GRANT.

OBITUARIES

FREDERICK THOMAS GRANT

(1870-1959)

Frederick Thomas Grant, A.M.I.M.C.E., M.R.San.I., was born at Maidstone, Kent, on 21st August 1870, and died there after a very short illness on 27th August 1959. On leaving school he was articled to Messrs. Ruck & Smith, Architects and Surveyors; the senior partner in this firm was Kent County Surveyor at the time and through him Grant became conversant with the work of public authorities. After holding the post of Assistant Surveyor at Maidstone he was appointed, at the early age of twenty-nine, to be Borough Engineer and Surveyor at Gravesend, a position he held for thirty-eight years. He retired in 1938. During that period Gravesend grew tremendously. He was a keen member of the Gravesend Rotary Club and a past President of the Gravesend Historical, Literary and Scientific Society.

F. T. Grant was encouraged as a boy to collect the Macrolepidoptera by the Rev. Cave Brown and one of his first books on the group was Edward Newman's "Illustrated Natural History of Butterflies and Moths", which he won as a swimming prize at school. In Gravesend he soon joined a band of enthusiastic entomologists, including Alderman H. Huggins and G. E. Frisby, F.E.S. The latter was especially interested in the Hymenoptera and Coleoptera.

Through the influence of Frisby, who was a member, Grant joined our Society in 1924, and shortly afterwards he started collecting Coleoptera. He was an accurate and precise man in all he did, his collections are models of good mounting and besides full data labels on every specimen, he kept detailed journals. These were arranged both under species and serially, each group of individuals of the same species taken on the same day being allotted a number. His serial journal for Coleoptera contains 7645 entries, which must represent the collection, mounting and identifying of over 10,000 specimens. The first were collected in 1926 and the last, which are as perfectly mounted as all the others, in 1950, when he was eighty years of age.

Much of his collecting was done in Cobham Park, Kent, often in company with Capt. J. A. Stephens, C.A., but like so many entomologists he spent his holidays in localities such as Wicken Fen, the New Forest and the Lake District. He also took numerous specimens as he went about his duties in Gravesend and the frequent appearance in his journals of "on bowling green" shows that even when engaged in his favourite sport, entomology was never far from his mind.

He made several striking captures: *Catopidius depressus* Murray which was new to the British list (Blair, 1942, *Ent. mon. Mag.*, 78: 172); *Conopalpus testaceus* Ol. at Cobham; *Heterostomus villiger* Reitter at Ringwood, Hants; and *Otiorrhynchus porcatus* Herbst. in some numbers in his garden, where he also took *Omosita depressa* (L.).

A quiet, but friendly man, Grant always strenuously avoided the limelight and so although he was a frequent attendee at our meetings and seldom missed the annual exhibitions, he never held high office in our Society; thus his well-deserved election to Honorary Membership on 12th December 1957 came as something of a surprise to him and gave him the greatest pleasure. He regularly attended the Verrall Suppers in the pre-war years and was one of the early members of the Amateur Entomologists' Society.

He was always anxious to help and encourage any young boy or girl who showed an interest in entomology; the writer himself was fortunate in having his early footsteps in the "other orders" guided by Grant, whose knowledge, not only of entomology, but of zoology in general, was wider and deeper than he himself was prepared to admit. With Grant's death many entomologists lost a real friend and entomology lost a fine student in the highest tradition of the great amateurs. He directed that the Society should have the first call on his collections and that the remainder should pass into the possession of the writer. His journals and collections are now housed in the Department of Zoology and Applied Entomology, Imperial College Field Station, Ascot, where they are freely available for use not only by the students of the College, but to all workers.

In 1900 he married Margaret Wakefield of Maidstone, who passed away in 1951, when he returned to Maidstone and lived with his eldest daughter, Miss M. Grant. To her and his son and younger daughter we extend our sympathy.

T. R. E. SOUTHWOOD.

ROBERT ELDON ELLISON
(1895-1959)

The untimely passing on 3rd September 1959 of Robert Eldon Ellison at the age of almost 64 has robbed the Society of one of its keenest and most erudite members. In recent years he seldom missed a meeting and nearly always brought an exhibit, entered into the discussions or had some interesting observation to make on Lepidoptera and their collecting. He was elected a member of Council in 1958 and seemed destined to occupy the Chair in due course, but unfortunately this was not to be.

He was born on 7th October 1895 in Kingstown, near Dublin, the son of the Rev. E. Ellison, whom he only survived by 18 months. His mother was Irish and he was always very proud of his Irish ancestry, since he lived his early days in the Emerald Isle. It was when he was at Clifton College that he was first fired with the enthusiasm for collecting butterflies and moths, especially when one of his first captures was a halved gynandromorph of *Pieris rapae* L. His university career at New College, Oxford, was broken by the 1914-1918 war, in

which he served in Intelligence Units, spending a period after hostilities in Occupied Germany. In the early 1920's he was an assistant master at Bruton and Charterhouse where he interested the boys in field collecting, but the call of far-off lands came to him and eventually he joined the Foreign Service. It was during his tenure of various posts that in his spare time he made large collections which were to bring him international fame. He is regarded as one of the foremost field collectors of foreign Lepidoptera there has been this century. His first appointment was as Vice Consul in Beirut in 1925. In this little-known part of the Middle East he was able to put his efforts and energies to best advantage and during his six years' tenure he made a minute study of the Lebanon and its Lepidoptera, observing their habits and habitats and embodying them in a complete list of these insects from that region written in collaboration with E. P. Wiltshire which was published in the Transactions of the Royal Entomological Society in 1939. It included a lycaenid, *Albulina ellisoni*, named after him by the celebrated German authority Pfeiffer.

In 1932 he was posted to Morocco and held Consulates at Fez, Marrakesh and Casablanca, covering the next six years. He was once more able to devote a good deal of time to amassing local Lepidoptera, especially from the Middle and Grand Atlas. In these excursions he was often assisted by that well-known authority on those parts, the late Harold Powell. From 1938-1940 he was in Abyssinia as Consul at Harar under the Italian Occupation. In this period he made what is generally regarded as the finest and most comprehensive collection of Lepidoptera ever brought from these remote Ethiopian regions. After serving as Consul at Port Said and Jeddah during the last war, he was sent in 1947 in that capacity to Panama, where in 18 months he accumulated some 10,000 specimens, nearly all set and including at least 650 species of butterflies. His stories of the flood of insects some nights in the volcanic areas of Costa Rica make our own captures in this country seem quite puny. His final posting in 1948 was to Muscat, where he had little scope for collecting and finally he became a victim of the intense heat and was invalided home.

He at once settled down to take up again his early love, the British Lepidoptera, with renewed fervour and during the next ten years he made expeditions to many parts of the British Isles, several to Scotland and two to Ireland in company with the writer, to the Burren in 1954 in search of *Calamia tridens* Hufn., and again in 1956 to Kerry. After living for a time in Bristol, he moved in 1952 with his family to a large house on the downs on the outskirts of Eastbourne. This was an ideal locality and situation and his six years' residence there provided him with a choice harvest. One evening in 1953 a grey noctuid alighted by his bedside while he was reading. He did not recognise it. It was one of the earliest records of *Calophasia lunula* Hufn. Later the same night an emerald appeared in his room. To his astonishment it was *Thalera fimbrialis* Scop. He started running a

mercury vapour trap regularly in his garden, where in 1954 he first took *Lithophane leautieri* Boisd. This insect subsequently increased in numbers each autumn. As was to be expected, many migrants came to his light. These included a melanic *Herse convolvuli* L., *Hippotion celerio* L., *Leucania unipuncta* Haw., *Luperina dumerilii* Dup., *Plusia ni* Hübn., *Cosymbia puppillaria* Hübn., and many *Palpita unionalis* Hübn. A remarkable capture there in 1957 was an *Arenostola extrema* Hübn., well outside its normal habitat in the fens, while the appearance of several specimens of *Eilema caniola* Hübn. confirmed old reports of its occurrence in Sussex. He added many species to Robert Adkin's local list and was about to publish a supplement to it. In the autumn of 1958 he moved to Elstead in Surrey where he once more, with his usual enthusiasm, began to collect in this rather different type of terrain, but ill-health soon overtook him. After an operation he rallied and was soon out with his net as keenly as ever till late July 1959, when a serious deterioration set in. He underwent special treatment in hospital but did not respond to it and mercifully passed away quite suddenly to the dismay and sorrow of his many friends.

Entomology was by no means his only pastime, for he was a noted philatelist and a recognised authority on stamps "used abroad". In 1954 when the Philatelic Congress of Great Britain was held at Eastbourne, he was its President. He was also a first-class classical scholar, a good mathematician and an accomplished linguist. He was extremely well read in both English and Foreign literature and could quote at length from it in both prose and verse. A keen follower of cricket, he could always be counted upon to know the County scores and much about past and present players and matches. He played the piano well and had quite a good voice. Many a long wait for insects to appear at night on the sheet was enlivened by old Irish folk-songs or excerpts from the Gilbert and Sullivan operas which he knew by heart. Above all, he was most generous with his captures, especially to the British Museum (Nat. Hist.) where it is hoped a large proportion of his vast collection may find a permanent home.

He was altogether a most entertaining companion, always ready with a quip or some subtle and amusing repartee. His intellectual achievements impressed themselves on all who came into contact with him. A good and staunch friend has passed from among us. Both this Society and the world of entomology is indeed the poorer by his going.

C. G. M. DE W.

ABSTRACT OF PROCEEDINGS

INDOOR MEETINGS

12th FEBRUARY 1959.

The PRESIDENT in the Chair.

The deaths were announced of Mr. D. A. Hawgood and Mr. E. J. Summers.

EXHIBITS.

Mr. E. E. J. TRUNDELL—A Pyrex cover to protect mercury vapour lamps against breakage during rain. The cover does not impair entry into the trap and reduces the mercury vapour radiation by only approximately ten per cent.

Mr. T. R. EAGLES on behalf of Mr. W. H. Spreadbury—The lichens *Xanthoria parietina* Th. Fr. and *Ramalina farinacea* Ach. from Seaford, Sussex. The specimens bore many apothecia.

Mr. A. E. GARDNER—Series of three local Carabidae (Col.); *Pterostichus aethiops* (Panz.) and *P. oblongopunctatus* (F.) taken by Mr. W. F. Davidson in Glencoyne Wood, Ullswater, Westmor., 28.i.59; also *Amara infima* (Dufts.) taken by himself on Oxshott Common, Surrey, 29.1.59.

COMMUNICATIONS.

Mr. A. E. GARDNER read extracts from a letter from Dr. B. P. Moore giving details of collecting in Australia.

Mr. M. W. F. TWEEDIE gave a fascinating talk on "The Malayan Gliding Reptiles", illustrated by the lantern, which provoked a lively and interesting discussion. (See Trans., p. 97.)

26th FEBRUARY 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. F. D. BUCK—A case of beetles of the Australian Tenebrionid tribe Helaeinae. Of the six genera comprising the tribe the following four were represented: *Helaeus*, *Saragus*, *Pterohelaeus* and *Encara*. He commented on the characteristics of these genera.

Mr. T. R. EAGLES—Hibernating larvae of *Cryphia perla* Schiff. (Lep., Noctuidae), found at Boxhill, Surrey, on a concrete fence, 14.ii.59. Their food-plants would be lichens and algae growing on the fence.

Major F. L. JOHNSON—(1) The following *Papilio* species captured by him in an isolated forest reserve in Ghana during 1956: *P. antheus* s.sp. *evombaroides* Eimer, a normal male, and a male with deep yellow markings on the upperside instead of green; *P. polices* Cramer, a normal male, and a male with asymmetrical upperside markings which were deep yellow and an abnormal shade of green, the colours merge in places; *P. phorcas* Cramer, a normal male, and three males with

varying light yellow patches and streaks bordering veins, in vivid contrast to the normal green colouring. These aberrations had not been seen by him previously in over 30 years collecting in West and Central Africa. No explanations were offered for these colour deficiencies; they occurred in nature and were not the results of any chemical contact after capture. The scales were normal, and the colour change appeared to have originated in some way from the veins of the wings. (2) The following gynandromorphs from Formosa: *Catopsilia pomona* F., halved; two *C. crocale* Cramer, one halved and the other a remarkable completely mixed mosaic; two *Ixias pyrena* s.sp. *insignis* Butler, halved mosaics, both showing to varying degrees red male markings within the white female apex; one example showed white female coloration between certain veins on the left hindwing.

Mr M. G. MORRIS—(1) A series of *Argyrotoza comariana* Zell. (Lep., Tortricidae) from East Malling Research Station, Kent, September and October 1958. (2) Specimens of *Phycita boisduvaliella* Guen. (Lep., Crambidae) bred from larvae in the pods of *Lathyrus maritimus* (L.) Bigel. from Shingle Street, Suffolk, October 1956. Also for comparison, examples of *Dioryctria banksiella* Rich. (3) A bilaterally oligomeric specimen of *Anthocoris nemorum* (L.) (Hem., Anthocoridae), with two normal examples for comparison. All from East Malling, Kent.

Sir ERIC ANSORGE—A series of the common and variable Geometer *Colotois pennaria* L. (Lep.), amongst which was one example with a definite black band across the wings. This form is not represented in either the Tring or South Kensington collections of the British Museum (Nat. Hist.).

Mr. R. M. MERE—An example of *Apocheima hispidaria* F. (Lep., Geometridae) with a melanic tendency which had occurred at mercury vapour light at Chiddingfold, Surrey, on the night of 25th February.

COMMUNICATIONS.

The PRESIDENT announced the bequest to the Society by the late Mr. D. A. HAWGOOD of £100.

Mr. Mere reported several species of moths at mercury vapour light at Chiddingfold during February which included *Erannis marginaria* F. and *Earophila badiata* Schiff. (Geometridae) which appeared on the night of 22nd; *Alsophila aescularia* Schiff. (Monocteniidae) on the night of the 24th; *Biston strataria* Hufn. (Geometridae) on the night of 25th; and *Phigalia pilosaria* Schiff. (Geometridae) which is well out.

Mr. A. E. GARDNER reported *Phlogophora meticulosa* L. on a door near the Society's rooms that evening, and Mr. H. D. SWAIN said *Selenia bilunaria* Esp. had emerged the same day.

Sir ERIC ANSORGE said he did not believe the season to be as early as some members seemed to think; in his experience *Biston strataria* Hufn. was two weeks earlier than this last year.

Mr. T. G. HOWARTH introduced four films, two on the microscope, one dealing with underwater surveying for oil, and one on the desert locust.

SPECIAL MEETING—12th MARCH 1959

The PRESIDENT in the Chair.

The PRESIDENT read the notice convening the meeting and from the Chair moved that Mr. R. M. Mere, the Council's nominee, be elected a trustee of the Society to fill the vacancy left by the late Mr. W. Rait-Smith.

Further nominations were invited from the meeting; and in the absence of any other nomination the President declared Mr. Mere elected and then closed the meeting.

12th MARCH 1959.

The PRESIDENT in the Chair.

The death was announced of Dr. G. V. Bull.

Mr. T. N. D. Peet was declared elected a member.

EXHIBITS.

Major F. L. JOHNSON—(1) A case of interesting exotic Lepidoptera: *Argema mittrei* Guér. (Saturniidae) from Madagascar; *Charaxes hadrianus* Ward (Nymphalidae), a male and a female of this rare species from the River Kassai in the Belgian Congo; *Papilio epycides* Hew. (Papilionidae) from Formosa; *P. epycides* Hew. s.sp. *melanoleucus* Ney. ab. *palluta* Nice from the Central Mountains, Formosa, showing extreme melanism. (2) *Goliathus goliathus* Drury (*giganteus* Lam.) (Goliath Beetle) from Ghana.

Mr. A. E. GARDNER—A collection of insects of several Orders collected in Madeira to illustrate the talk he was giving in conjunction with Mr. E. W. Classey.

Mr. B. GOATER—*Ricciocarpus natans* (L.) Corda, one of the free-floating liverworts, the other being *Riccia fluitans* L. with longer, narrower thallus. Both have a terrestrial form. *Ricciocarpus natans* is rather uncommon in Britain, but is widely distributed abroad and sometimes forms extensive scums on quiet lakes; this particularly happens in Kenya. Reproduction, as in many aquatics, is chiefly vegetative, though sexual organs occur sometimes. The exhibit came from ponds at Aldenham, Herts.

COMMUNICATIONS.

Dr. C. G. M. DE WORMS said that most early Lepidoptera were now out; in particular he mentioned *Apocheima hispidaria* F. and *Biston strataria* Hufn. (Geometridae) which were well out and *Orthosia incerta* Hufn. (Noctuidae) which was not in large numbers.

The PRESIDENT drew attention to an appeal in *The Field Naturalist* for information regarding two forms of Blue Tit, one with a dark line on the chest, suspected as a northern form, and the other without the

line, suspected as a southern form. He said a pair were occupying a nesting box in his garden at Epsom, Surrey, just outside his bedroom window, and both had the dark line which did not support the northern-southern form theory. Mr. C. N. HAWKINS queried whether this may not be in some way due to moulting. Mr. B. GOATER doubted if there was anything in the idea that these two kinds may be different forms; our bird was in fact a sub-species, the typical form occurring on the Continent and migrating occasionally to the southern and Kent coasts.

Mr. A. E. GARDNER and Mr. E. W. CLASSEY gave a talk on "The Fauna of Madeira" which they illustrated with many coloured transparencies showing the terrain in general and many habitats in particular. (See Trans., p. 184.)

26th MARCH 1959.

The PRESIDENT in the Chair.

A welcome was extended to Dr. C. L. Remington of Yale, U.S.A., by the PRESIDENT, who also announced that our member Professor O. W. Richards had been elected a Fellow of the Royal Society.

EXHIBITS.

Mr. S. N. A. JACOBS—Tortricid moths from the U.S.A. and from the British Isles. The species included *Argyrotoza bergmanniana* L. from the U.S.A., Ireland, and England; *Tortrix forskåleana* L. from England, *Argyrotoza albicomana* Clem. and *A. semipurpurana* Kearf. from the U.S.A., also *Pseudoargyrotoza convagana* F. from England. He remarked on the light hindwings of the American, and the dark hindwings of the British and Irish, *A. bergmanniana*.

Mr. T. R. EAGLES—*Ornithopus compressus* L. (Papilionaceae), mounted specimens of the plant in flower, seedlings, and a ripe pod. These were grown from seed collected by Miss E. Poulter and given by her to Mr. T. J. Honeybourne. Plants were found alongside the Maidstone by-pass, near Sidecup, Kent, in 1957. The species is a somewhat uncommon introduced alien. Seeing that many motor cars ferried from the Continent use this road one wonders if the seed was brought on their wheels.

Mr. F. D. BUCK—Proofs of blocks of four field meetings for publication in the 1958 Proceedings. The blocks were donated by Mr. K. A. Spencer.

Mr. B. GOATER—(1) Full grown larva of *Amathes depuncta* L. (Lep., Noctuidae) *ab. ovo*, Inverness-shire. The young larvae of the brood hatched in the autumn and went straightway into hibernation in hollow grass stems. Kept in a refrigerator until March, when the survivors came out and rapidly fed up on dock. (2) Larvae of *Coenocalpe lapidata* Hübn. (Lep., Geometridae), Inverness-shire, *ab. ovis*. Eggs were laid in September and hatched in March, the larvae feeding on buttercup.

COMMUNICATIONS.

Mr. R. ELDON ELLISON said that he had had two good nights with his trap in the Godalming-Farnham area of Surrey recently. *Apocheima hispidaria* F. (Geometridae) had occurred and four *Dasycampa rubiginosa* Schiff. (Noctuidae) had been taken. The commonest moth had been *Achlya flavicornis* L. (Thyatiridae), nearly 100 being trapped in one night.

Mr. GOATER was questioned on keeping *Amathes depuncta* in a refrigerator. He said that the larvae should not be kept in the coldest part of the refrigerator and added that he had lost a number which had died of mould. This he said had appeared to have occurred after the insects had been removed into a warmer temperature and he suggested the mortality rate might be reduced by taking the larvae from the grass stems as soon as they had been removed from the refrigerator.

Dr. C. L. REMINGTON read a paper "Reflections on similarities and differences between European and North American Lepidoptera" which aroused a great deal of interest. Dr. Remington illustrated many of his points with coloured transparencies. Following the paper the discussion and questions ranged over hybridisation; the direction of introduction, east-west or west-east; the effect of flight differences in mimicry cases; and the development pattern of industrial melanism among other points.

9th APRIL 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Dr. C. G. M. DE WORMS—A larva of *Heliothis armigera* Hübn. (Lep., Noctuidae) found in a tomato from the Canary Islands. For the past week it had been feeding on Dandelion and Primrose. Though not a pest in Great Britain, in North America it causes much damage and was known as the Cotton Boll Worm.

Mr. T. R. EAGLES—Catkin-bearing twigs from a monoecious form of the Common Sallow, *Salix atrocinerea* Brot. He said the willows are, with the rarest exceptions, dioecious in that each bush bears nothing but male flowers or nothing but female flowers. Some twenty years ago, at one of our field meetings, Mr. W. H. Spreadbury drew attention to a bush which had some catkins consisting wholly of male flowers, others consisting wholly of female flowers and yet others made up of a mixture of male flowers and female flowers. This was at the foot of the Downs near Ranmore, Surrey. A cutting was taken home and tended carefully in the knowledge that it was not the best time of the year to get a cutting to strike. Luckily success was achieved, for on the next visit to the spot it was found that the track had been widened

and the bush gone. The cutting has now grown into a large and flourishing bush and it had been noticed that the proportion of male to female flowers varied from year to year. In some years the male flowers have predominated; in others the reverse has been the case. In 1959 almost all the flowers have been male; it has been necessary to search carefully to find a catkin with any female flowers and there are only one or two catkins with all the flowers female. Of about 1,000 catkins only about ten were wholly or partly female.

COMMUNICATIONS.

The LIBRARIAN reported the acquisition of the following volumes: *The Freshwater Life of the British Isles* by John Clegg, Frederick Warne & Co. Ltd., Wayside and Woodland Series; *Beetles of the British Isles*, by E. F. Linssen, two volumes, in the same series as the above; *The World of Spiders*, by W. S. Bristowe in the New Naturalist Series.

Referring to Mr. Goater's exhibit at the previous meeting, Mr. C. N. HAWKINS suggested that spraying periodically with a weak solution of salt water might reduce the incidence of mould.

Dr. DE WORMS said that during the past week nearly all the spring Lepidoptera had come out at once, especially the Orthosiinae. Last week at Chiddingfold, Surrey, *Colocasia coryli* L. and *Orthosia miniosa* Schiff. (Noctuidae) had been taken; and at Dunsfold, Surrey, *Polygonia c-album* L. (Nymphalidae) had been seen on willow, which was now nearly over. *Lycia hirtaria* Clerck had also occurred.

Dr. A. M. MASSEE read a paper "The Natural Control of Orchard Pests". He was closely questioned on the subject at the termination of his paper.

23rd APRIL 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. F. D. BUCK—An example of the South American Tenebrionid beetle *Aryenis unicolor* Blanch. He read a note on the species.

Dr. C. G. M. DE WORMS—A case of zygaenid moths from southern France illustrating several forms of a number of species.

Mr. T. R. EAGLES—The fungus *Morchella esculenta* L. found recently in a fallow field near Box Hill, Surrey. On the Continent this species is well known and much esteemed as an edible. In volume 1 of Roger Heim (1957, *Les Champignons D'Europe*) it is figured and marked with the sign which means an edible of the first quality, and there is a plate "Culture de la Morille" showing its life cycle and method of growing it.

Mr. B. GOATER—Examples of *Diarsia dahlui* Hübn. (Lep., Noctuidae) bred from eggs laid by a female taken in Inverness-shire in September 1958.

Mr. W. H. SPREADBURY—Abnormal cabbage leaves with cup-like outgrowths from the mid-rib which Masters (1869, *Vegetable Teratology*) called "ascidia" and figured similar outgrowths on lettuce leaves.

Mr. D. G. HALL—(1) A pair of *Ischnodes sanguinicollis* (Panz.) (Col., Elateridae) taken in rotten wood in Barnsthorpe Wood, Surrey, whilst on the Society's field meeting at Effingham, 19.iv.59. (2) A millipede, *Polyxenus lagurus* (L.), which he had found in association with ants.

COMMUNICATIONS.

The SECRETARY read a report of the Riddlesdown field meeting submitted by Mr. F. Rumsey, and in the absence of the leader, Mr. S. Wakely, gave a brief account of the meeting at Effingham.

Dr. C. G. M. DE WORMS, discussing seasonal Lepidoptera, said he had seen many *Pieris rapae* L. and some *Euchloë cardamines* L. (Lep., Pieridae). Nearly all the Prominents which can be expected just now are out; *Odontosis carmelita* Esp. (Notodontidae) is still about. *Colocasia coryli* L., *Agrotis ipsilon* Hufn. and *Gypsotea leucographa* Schiff. (Noctuidae), *Menophra abruptaria* Thunb. and *Aethalura punctulata* Schiff. (Geometridae), *Nomophila noctuella* Schiff. (Pyralidae) and *Polyphlocia ridens* F. (Thyatiridae) had occurred in the past two weeks. At Effingham, Surrey, on the 14th, *Apatele psi* L. (Noctuidae) had been seen, and *Pararge aegeria* L. (Satyridae) had been noted at Chiddingfold, Surrey. In all he thought the season to be about ten days in advance of normal.

Cucullia verbasci L. (Noctuidae) and *Cerura vinula* L. (Notodontidae) were reported from the Witley area of Surrey. At Chiddingfold, *Nycterosia obstipata* F. (Geometridae) had occurred at light on the 16th and *Schreckensteinia festaliella* Hübn. (Choreutidae) was flying on the 19th.

A discussion took place on the effect of the local soils on the relative emergence of Lepidoptera. It was agreed that in clay localities emergences tended to be later than in those areas with lighter soils.

Mr. S. WAKELY said he had been breeding *Xanthorhōe biriviata* Bork. (Lep., Geometridae) and had noticed that three weeks after their pupation, in August last, all the wing markings could be seen through the pupal case. An attempt to bring out some of the moths by raising the temperature had led to the loss of the three pupae subjected to the temperature change.

Referring to Dr. de Worms' exhibit, Mr. R. ELDON ELLISON expressed the opinion that the division of some of the *Zygaenidae* into sub-species had been drawn too tight. Long series collected over several years would show the sub-species would overlap.

Mr. WAKELY commented on the old saying regarding the leafing of oak and ash trees and the rainfall of the ensuing summer. He said that for many years he had watched these two trees in early spring and until this year was of the opinion that the oak never produced foliage before the ash. However, this year in Ruskin Park, South London, the oak was well in advance of the ash. Other members agreed on the relative states of these two species of tree.

14th MAY 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. N. WILDING—Young larvae of *Cucullia chamomillae* Schiff. (Lep., Noctuidae) bred from a female taken at Beckenham, Kent.

Mr. L. T. FORD—A cone of the Stone Pine bisected to show the arrangements of the seeds.

Mr. R. ELDON ELLISON—A photograph of a forest tree in Panama. He also had cases of Lepidoptera laid out on the tables to support his talk.

Mr. T. R. EAGLES—Leaf of the Indian Horse-chestnut (*Aesculus indica* Colebrooke) from near Boxhill Station, Surrey. He read the following note: "I am showing a leaf of the common Horse-chestnut (*Ae. hippocastanum* L.) for comparison. The leaflets of the Indian species are more slender, more inclined to have a stem and less irregularly toothed. Neither tree is native but whereas the latter was introduced early in the seventeenth century, the Indian species was not grown here until about 200 years later, and is still scarce. It may not be realised that the familiar tree is not a native. I remember seeing a film of an event that happened hundreds of years before the first common Horse-chestnut was grown in England. Great trouble was taken to make the film in the actual grounds. There were many close-ups and most of them showed clearly the unmistakable leaves of the Conker".

Mr. P. MATTHEWS—Five plates, numbered 5, 7, 9, 11 and 12, illustrating Lepidoptera from a scarce book published in 1742 by Benjamin Wilkes. Further information is given by J. O. T. Howard (1951, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1949-50: 63).

COMMUNICATIONS.

The LIBRARIAN reported the addition to the library of *Excursion Flora of the British Isles* by Clapham, Tutin & Warburg.

Field meeting reports were given of Wimbledon Common (R. W. J. Uffen), Boxhill (B. F. Skinner) and Oxshott (F. D. Buck).

Mr. R. ELDON ELLISON said that a number of the moths in his trap were those which normally occur in June. A week ago he had taken *Hyloicus pinastri* L. (Lep., Sphingidae) and *Semiothisa liturata* Clerck (Lep., Geometridae) was well out. In Scotland, said Comdr. G. W. HARPER, the same conditions applied, *S. liturata* Clerck had occurred five days previously, on 9th May *Eumichtis adusta* Esp. (Noctuidae) had been taken, and *Hadena thalassina* Hufn. had been seen some two weeks ago. At Newbury, Berks., he had taken *Apatele alni* L. (Noctuidae).

Xanthorhoe biriviata Borkh. (Geometridae) was reported flying on 3rd May.

Mr. R. FAIRCLOUGH said that though there were many species out early in the Reigate area of Surrey numbers were small. Mr. Ellison agreed.

Though a number of early emergences were being reported, Mr. J. O. T. HOWARD said he was finding a number of late moths in his trap at Dorking, Surrey; among these were *Orthosia gothica* L., *O. stabilis* Schiff. and *O. incerta* Hufn. (Noctuidae).

Argynnis euphrosyne L. (Nymphalidae) was said to be well out in Sussex and at Chiddingfold, Surrey, where *Leptidea sinapis* L. (Pieridae) was also out. The larvae of *Apatura iris* L. (Nymphalidae) were, according to one member, about an inch long.

The commonest moth in the Mill Hill area of N. London was *Gonodontis bidentata* Clerck (Geometridae) Mr. BARRY GOATER said. He had taken the first melanic example in N. London a week ago. For some time now he said melanic *G. bidentata* Clerck had been known from Dulwich in S. London (cf. A. E. Aston, 1959, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1958: 19). Another member reported this species had occurred commonly in W. London, but to his knowledge the melanic form had not yet been recorded. Melanism was well in evidence in W. London, particularly in the Pugs for example. In N. London, too, melanism was widespread where *Menophra abruptaria* Thunb. (Geometridae) was some 50% melanic.

Referring to melanism in *G. bidentata* Clerck it was pointed out that it had been suggested these melanics are offspring of bred melanics which had been released.

Mr. R. ELDON ELLISON read a paper "An Amateur in Panama", he concluded with a series of pictures of Panama shown on the epidiascope followed by some coloured transparencies of Panamanian Rhopalocera.

28th MAY 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. R. ELDON ELLISON—Larvae of *Dasycampa rubiginea* Schiff. (Lep., Noctuidae) obtained from a female caught in a mercury vapour trap in West Surrey some two months previously.

Mr. M. G. MORRIS—*Scrophularia aquatica* L. (Water Betony) from near East Malling, Kent, together with two common species of beetle associated with it; *Cionus alauda* (Herbst) and *C. scrophulariae* (L.) (Curculionidae). He also showed young larvae of *Cionus* sp. which were feeding on the plant.

Mr. S. WAKELY—(1) A pupa of *Hypercallia christiarnana* L. (Lep., Oecophoridae); he had found several larvae again this year on Milk-wort at Wrotham, Kent. (2) Larvae and cocoons of *Parascotia fuliginaria* L. (Lep., Plusiidae) from Byfleet, Surrey.

The PRESIDENT showed an article extracted from *Homes and Gardens* for May dealing with Cosford Mill, its restoration and conversion into a dwelling. Cosford Mill, he reminded the meeting, was the venue of several successful field meetings in recent years

COMMUNICATIONS.

Mr. R. M. MERE commented on an article in *Country Life* for 21st May by L. Hugh Newman. He said the article included photographs of moths at rest on tree trunks, among which was one of *Apamea monoglypha* Hufn. (Noctuidae). From the text Mr. Mere read an extract on industrial melanism which attributed melanic forms of *A. monoglypha* to this cause. If Mr. Newman wished to choose a worse example of industrial melanism, said Mr. Mere, he could scarcely have done so. Melanism occurs commonly in this species in Inverness-shire, the Burren of Clare, and in the north of England quite independent of industrial areas, and occurs as a rarity in the south of England. Other members reported melanic examples of the insect from Wicken Fen, Cambs., and from the Lake District. Mr. C. N. Hawkins said that since Dr. Kettlewell had produced his notable work on the subject, it appeared to be a popular belief among some people that any dark form was due to industrial melanism.

It was suggested that the Secretary write to the Editor of *Country Life* pointing out this inaccuracy.

Field meeting reports were given by Mr. R. W. J. UFFEN of the Ham Street, Kent, and Whippendell Wood, Herts. field meetings.

Mr. B. GOATER said that on the night of 14th/15th May he had taken an example of *Xylomyges conspicillaris* L. (Lep. Noctuidae) in his mercury vapour trap at Mill Hill, Middx. He asked if any one had been breeding this species and releasing them in the area, or whether this could have been the capture of a migrant. The distribution of the moth was discussed and the nearest recorded capture appeared to be at Brentwood, Essex, but this was in the previous century. In view of the possibility of this capture being that of a migrant, and of the recent easterly winds, it was queried whether anyone had noted any migrants. Only Mr. ELDON ELLISON reported a few *Plusia gamma* L. (Plusiidae). It appeared that the numbers of moths trapped had been low, about 80 insects covering some 30 or so species per night had been the pattern over the past month.

Details were given of the Lepidoptera which might be expected at Whippendell Wood and which provoked a discussion on the distribution of *Discoloxia blomeri* Curt. and *Abraxas sylvata* Scop. (Geometridae).

Mr. ELDON ELLISON commented on the prevalence of geometers. In his trap this year out of approximately 100 species something over 50 had been Geometridae. Noctuids were comparatively few and far between. Mr. UFFEN said that on Wimbledon Common, Surrey, recently at dusk he had seen numbers of geometers but no noctuids. It was suggested by Mr. HAWKINS that this could be due to pupating habits, as in dry spells the ground becomes sufficiently hard as to prevent the escape of noctuid moths from their pupae.

On the other hand, Mr. M. G. MORRIS said, there were only two geometrid species in the trap at East Malling, Kent, in the past three

weeks, but many more Noctuidae. The commonest moths were, however, Arctiidae.

11th JUNE 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. F. D. BUCK—Three examples of *Hydrobius (Limnoxenus) niger* (Zschach) (Col., Hydrophilidae) from Wood Walton Fen, Hunts.; one taken 3.v.59 and two more taken 6.vi.59 with, for comparison, *H. fuscipes* (L.). According to Prof. F. Balfour-Browne (1958, *Brit. Water Beetles*, 3: 19), *H. niger* is a species of southern England and he mentions taking it in the Fen in 1938 (a few specimens) and again in 1952 (one example). Mr. A. E. Gardner, with whom he was working, took two others, one on each occasion.

Mr. S. WAKELY—Pupae of *Hyponomeuta irrorella* Hübn. (Lep., Hyponomeutidae). He said he had been to the locality in N.W. Kent where the species was known to occur and was hoping to be able to distinguish the larvae from *H. cognatella* Hübn. which feeds on the same food-plant. The two forms of larvae could not however be distinguished in the field and neither could they subsequently, and since it was known that *H. cognatella* feeds gregariously and pupates together while *H. irrorella* pupates singly, only larvae feeding in comparative isolation were taken. When the larvae pupated it was found that *H. irrorella* was in fact amongst the material collected. The pupal habits are quite distinct—*H. cognatella* covers the pupae with silk while *H. irrorella* pupates exposed, with only a strand or two of silk to retain it in position.

Mr. B. GOATER—Examples of (1) *Amathes depuncta* L. (Lep., Noctuidae) bred from ova obtained in Inverness-shire during September 1958. (2) *Xylomyges conspicillaris* L. (Lep., Noctuidae), a specimen obtained at mercury vapour light at Mill Hill, Middx., 14.v.59. Apparently the first record for the County (see Communications for 28th May, p. 10). (3) *Gonodontis bidentata* Clerck (Lep., Geometridae), a melanic male from Mill Hill, 7.v.59 (see Communications for 14th May, p. 9).

Mr. T. R. EAGLES—An example of *Myopa buccata* (L.) (Dipt., Conopidae) taken on the Chilworth, Surrey, field meeting, 30.v.59. The specimen was identified by Mr. R. W. J. Uffen.

COMMUNICATIONS.

The LIBRARIAN reported the purchase of Pearce, E. K., *Typical Flies, A Photographic Atlas of Diptera including Aphaniptera*, Series I, Second Edition, 1928; Second series, 1921; series III, 1928. A copy of Lack, David, 1957, *Evolutionary Theory & Christian Belief, The Unresolved Conflict*, had been presented to the Society. Messrs. Buncle & Co Ltd., of Arbroath, had sent us for review a copy of a book published by them, namely *A Guide to the Study of Lichens* by Ursula K. Duncan.

This book has only just been issued and is thus completely up to date. Any other books on lichens are more or less out of date and, moreover, difficult to obtain.

Field meeting reports were given by Mr. S. WAKELY of the Chilworth and Pulborough meetings.

Mr. J. O. T. HOWARD said Mr. Goater's melanic *Gonodontis bidentata* Clerck is different from the Scottish melanic he had recently taken at Aviemore, Inverness-shire. This was much blacker, particularly on the thorax than the specimen exhibited. The examples from south London were, according to Mr. Wakely, also darker.

At Dunsfold recently, said Sir LEONARD WAKELY, very few *Argynnis selene* Schiff. (Lep., Nymphalidae) were to be seen and no *Leptidea sinapis* L. (Lep., Pieridae) at all.

The PRESIDENT again referred to the question of the dark streak on the breast of the Blue Tit (see Communications, 12th March, p. 3), or its absence. He said the pair he had previously mentioned nesting in his garden at Epsom, Surrey, now had young and these also had the streak, very faint and barely discernible, but present. Mr. EAGLES, too, in his garden at Enfield, Middx., had seen a Blue Tit with a streak, but Mr. C. N. HAWKINS who had a family of the bird appearing regularly in his garden at Wimbledon, Surrey, said none of them, either adult or young, had the streak.

An instance was given by Mr. F. D. BUCK of a specimen of *Dytiscus marginalis* L. (Col., Dytiscidae) ejecting a foetid liquid when handled. He said he was holding the insect between the thumb and forefinger examining the underside and exerting a slight pressure laterally. After a few seconds the beetle ejected a fairly large amount of clear liquid, very slightly thicker than water on to the palm of his hand in sufficient quantity to run down his wrist. The smell was, in his opinion, considerably worse than the thick brown liquid similarly ejected by some Carabidae, and in much greater quantity.

25th JUNE 1959.

The PRESIDENT in the Chair.

The death was recorded of Mr. R. A. Fraser.

EXHIBITS.

Dr. C. G. M. DE WORMS—(1) The larva of *Apatele menyanthidis* View. (Lep., Noctuidae) which he had bred from eggs laid by a female taken in Scotland during May. (2) The larva of *Orgyia recens* Hübn. (*gonostigma* auctt. nec Scop.) (Lep., Lymantriidae) which he had received from Mr. G. E. Hyde who had taken the moth in the vicinity of Doncaster, Yorks.; and for comparison, the larva of *O. antiqua* L.

Mr. R. ELDON ELLISON—(1) A series of *Odontosia carmelita* Esp. (Lep., Notodontidae) from W. Surrey. (2) *Achlya flavicornis* L. ab. *interrupta* Houlbert (Lep., Thyatiridae) also from W. Surrey, with the

typical form for comparison. (3) Photographs of a small birch growing on the stump of a cut down conifer.

Mr. R. W. J. UFFEN—Pupae and imagines of the following Lepidoptera (Hyponomeutidae): *Hyponomeuta irrorella* Hübn. and *H. cognatella* Hübn. from spindle, taken on the High Halstow, Kent, field meeting. Also *H. padella* L. from hawthorn, comprising examples with grey forewings from High Halstow and examples with white forewings from Whippendell Wood, Herts.

Mr. M. G. MORRIS—(1) A specimen of *Deraeocoris scutellaris* (F.) (Hem., Miridae) swept at Shoreham, Kent, 13.vi.59. This is an uncommon bug and there appears to be some uncertainty with regard to its plant association. It has been swept from *Calluna* at Royston, Herts., and has been found on hazel; neither of these occurred at Shoreham (chalk downs). Recent records of this insect include several at light at Rothamsted, Herts., a few years ago (Southwood), a specimen swept at Trottiscliffe (Massee) and single specimens at light at East Malling, Kent, in 1958 and on 24.vi.59. It seems that the species is predaceous; Dr. Massee has kept one alive on rose aphids for two weeks. It would be interesting if collectors could look out for this species when collecting on chalk downs so that its habitat could be discovered. In this connection it should be noted that, in the field, this species could be overlooked as the common *Rhopalotomus ater* (L.). (2) Specimens of *Cymus obliquus* Horváth (Hem., Lygaeidae) swept from *Scirpus* sp., Berkshire, 22.vi.59. This is the only known British locality for this extremely local species; the insects are, however, abundant there. Dr. Southwood, who rediscovered the species, has a note on it in the press. Bedwell took 2 examples on Wimbledon Common, and it is believed that one was taken in Hampshire before that.

Mr. T. R. EAGLES—The lichen *Cladonia impeza* Harm. from Westend Common, near Woking, Surrey. This is often spoken of as Reindeer Moss and has been recorded as *Cladonia rangiferina* (L.) Web. It is not a moss and is not the lichen generally eaten by reindeer. *C. rangiferina* is a northern species and records of its occurrence in Surrey are regarded as erroneous (Watson, W., 1953, *Census Catalogue of British Lichens*, p. 50, No. 874). The range of these and allied species is discussed by Ursula K. Duncan (1959, *A Guide to the study of Lichens*, p. 71).

The PRESIDENT—A Nematode worm which he had found crawling on a plant in his garden after the recent storms. It is understood that the sexual forms of these animals leave their haunts in the soil after rain in the summer and ascend plant stems. The early stages are spent in the bodies of insect larvae. During the discussion on the exhibit Mr. W. H. T. Tams said they appear to come up onto the vegetation after storms to lay eggs which are ingested by insects, usually grasshoppers and allied species. Another member was of the opinion that this was the worm which infested the earwig. Dr. B. J. MacNulty said that when breeding Lepidoptera in W. Africa larvae excreted similar animals on several occasions which always resulted in the death

of that particular larva. Mr. C. N. Hawkins said he had sometimes seen the worm in his garden but always confined to a small patch. It was also suggested that the worm belonged to the genus *Mermis*; and it was also stated that the ingestion of the egg was always fatal to the host.

COMMUNICATIONS.

The LIBRARIAN said that Mr. N. Niblett had presented to the Society a most important work on a section of the Hymenoptera. It is *Les Cynipides* by J. J. Kieffer. The two volumes contain over 1,400 pages, 48 plates and the original descriptions of many species.

Reports were given of the High Halstow field meeting by Mr. A. W. GOULD and Mr. S. WAKELY reported on the Otford meeting in the absence of the leader.

Dr. DE WORMS said that Mr. Webb of Lincolnshire had told him in a letter of the capture of a number of *Leptidea sinapis* L. (Lep., Pieridae) in Saulcey Forest, Northants, which included some females with brown wing tips. In the same letter, Mr. Webb said *Carterocephalus palaemon* Pall. (Lep., Hesperidae) was seen on the wing in Lincolnshire in mid-May. Mr. B. F. SKINNER confirmed the *Leptidea sinapis* L. females with brown wing tips in Saulcey Forest by saying that Mr. T. J. Dillon had taken one. Dr. de Worms said he thought the season was some two weeks earlier than usual even in Scotland and he gave news of his recent collecting trip to the Continent where the season appeared to be early, too. At Wood Walton Fen, Hunts., he had recently taken six examples of *Pyrausta perlucidalis* Hübn. (Lep., Pyralidae). The previous night, he continued, had been very good for the mercury vapour trap, three people had each taken six species of Hawk moth. However, he thought butterflies were scarce.

Mr. R. ELDON ELLISON said that it was his experience that last night was the most prolific this year.

On the subject of butterflies, Mr. WAKELY said he had seen *Aphantopus hyperantus* L. (Satyridae) at Otford, Kent, a short while ago which appears to be early for this species. Mr. R. F. HAYNES said very few butterflies were to be seen at Killarney, Ireland, when he was there recently.

At Wood Walton Fen, it was reported, a specimen was taken of *Eupithecia palustraria* Doubl. (Lep., Geometridae) on the afternoon of 6th June.

Referring to Coleoptera Mr. A. W. GOULD said that *Lucanus cervus* (L.) (Lucanidae) was quite common at Woolwich, S.E. London, and that he had seen *Helops caeruleus* (L.) (Tenebrionidae) crushed on the pavement there. Mr. HAWKINS said that though *L. cervus* is usually common at Wimbledon, S.W. London, he had not seen it so far this year, but another member said it was common at Surbiton, Surrey. Mr. Wakely said he had recently received a dark example of *Nacerdes melanura* (L.) (Oedemeridae) from a new building containing no wood in Shaftesbury Avenue, Central London.

Sphinx ligustri L. (Lep., Sphingidae) was reported in Wimbledon the previous week, all females. This gave rise to a discussion on the distribution of the species in the environments of London and to its choice of food plant.

9th JULY 1959.

Mr. J. L. HENDERSON in the Chair.

Mr. H. N. E. Alston was declared elected a member.

EXHIBITS.

Mr. J. L. HENDERSON—*Ceuthorrhynchidius rufulus* (Dufour) (Col., Curculionidae) which he had taken on a *Plantago* species, 28.vi.59, in his garden at Purley, Surrey. The species is very local and is confined to the south coast from Kent to Dorset except for the records of one example from Windsor Forest, Berks. (Donisthorpe, 1939, *Prelim. List Col. Windsor For.*, London, p. 110) and a number at Purley, Surrey, in 1944 and 1945.

Mr. T. R. EAGLES—Leaves of *Iris ochroleuca* L. mined by a dipterous larva, *Phytobia (Dizygomyza) iridis* (Hendel) (Dipt., Agromyzidae). The leaves of *Iris foetidissima* L. are commonly attacked by this fly (cf. *Proc. S. Lond. ent. nat. Hist. Soc.*, 1954-55: 91, and Hering, E. M., 1951, *Biology of the Leaf Miners*, p. 61). Other species of garden iris have not, in my experience, been attacked. It may be of significance that the crushed leaves of both species have a very similar unpleasant smell. *Iris ochroleuca* is fairly common in gardens; it has tall yellow and white flowers appearing a little later than those of the bearded irises.

Mr. T. G. HOWARTH—A larva of *Charaxes jasius* L. (Lep., Nymphalidae) bred from ova found on *Arbutus unedo* L. (The Strawberry Tree) at Bagur, Spain, 19.vi.59.

COMMUNICATIONS.

It was announced that a large collection of Nigerian Lycaenidae had been donated to the Society's collection by the Rev. D. P. Murray.

Mr. J. L. HENDERSON commenting on the records of *Lucanus cervus* L. (Col., Lucanidae) at the previous meeting said he had seen a number in his garden at Purley this year, and Mr. T. R. Eagles added that a male had been taken at Enfield, Middx.; the species is not common as a rule in the northern environments of London.

Dr. C. G. M. DE WORMS again commented on the Lepidoptera of the season. He said *Oria musculosa* Hübn. (Noctuidae) was now nearly over, but amongst the Nymphalidae *Apatura iris* L. was on the wing the previous week-end, and *Limenitis camilla* L. and *Argynnis paphia* L. were well out. *Aglaia urticae* L. was also out, and Mr. Hawkins added *Vanessa atalanta* L.

Mr. HENDERSON said he had recently found sweeping for Coleoptera very poor indeed.

Mr. C. N. HAWKINS said he had noticed a sudden influx of *Tenebrio molitor* L. (Col., Tenebrionidae) recently, several had occurred in his house. It was pointed out that the beetle does fly well at times; and Mr. F. D. Buck said, in his experience, the years when this insect is prevalent away from its normal pabulum of stored cereals and cereal products, are those years which are very warm and dry. This could be due to better development of colonies of the insect in their usual habitat under these conditions; and, since this species is always more active and flies more readily in hot dry weather, its consequent dispersal over a much wider area.

Commenting on Mr. Eagles exhibit, Mr. K. A. SPENCER said *Phytobia iridis* (Hendel) can be a serious pest on *Iris ochroleuca* L. He mentioned that *Iris spuria* L. was mined by fly and also mentioned another agromyzid fly which mined the same plants.

Mr. H. D. SWAIN showed a very interesting series of slides of the Lake District which was followed by a few experimental exposures with electronic flash.

23rd JULY 1959.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. R. ELDON ELLISON—A selection of aberrant forms of Lepidoptera including *Callimorpha jacobaeae* L. ab. *gilleti* André (Arctiidae) with confluent red spots; *Chilodes maritima* Tausch. ab. *nigristriata* Staud. (Noctuidae); *Plusia iota* L. abs. *percontationis* Treits. and *inscripta* Esp. and *P. pulchrina* Haw., abs. *percontatrix* Auriv. and *incipiens* Schaw. (Plusiidae), each of these two *Plusia* species thus being shown with the spots united and with the spots partly obsolete. He also showed examples of *Hepialus fusconebulosus* Deg. (Hepialidae) approaching ab. *gallicus* Led.; *Apatele leporina* L. (Noctuidae) with dark submarginal shade; *Pseudoboarmia punctinalis* Scop. (Geometridae) of the melanic form ab. *humperti* Humpert; and unusual forms of *Spilosoma lubricipeda* L. (*menthastri* Esp.) (Arctiidae), and *Trichopteryx carpinata* Borkh., *Cosymbia pendularia* Clerck (one of the darker grey forms) and *Chiasmia clathrata* L. (Geometridae).

Mr. R. W. J. UFFEN—A living example of *Isophrictis tanacetella* Schrank (Lep., Gelechiidae) from Bookham Common, Surrey, where it is associated with *Achillea ptarmica* L.

Mr. M. G. MORRIS—Some Curculionidae (Col.) taken on the Dungeness, Kent field meeting, 12.vii.59: *Apion sedi* Germ., *Otiorrhynchus ovatus* (L.), *Smicronyx jungermanniae* (Reich.), *Tychius meliloti* Steph., *T. tibialis* Boh., *Phytonomus venustus* (F.), *Ceuthorrhynchus geographicus* (Goeze), *Nanophyes marmoratus* (Goeze) and *Gymnetron antirrhini* (Payk.).

COMMUNICATIONS.

Mr. C. N. HAWKINS commented further on the dark line on the breast of the Blue Tit, he said he had noticed that the feathers on the breasts of the birds in his garden at Wimbledon, S.W. London, met in a line and in some lights gave the impression of a dark line. He wondered if this could be the cause of the reports of slightly marked birds. The PRESIDENT said that the young birds which he had previously reported having a faint line did in fact develop a distinct line similar to that on the parent birds. (See Communications, 12th March, p. 3; and 11th June, p. 12.)

Mr. F. D. BUCK remarked on the *Ceuthorhynchus geographicus* (Goeze) shown by Mr. Morris, he said he had once swept this species in some numbers from *Echium vulgare* L. on Box Hill, Surrey, and though he had frequently looked for the beetle again, both by sweeping and by searching at the roots of the plant, he had failed to turn the species up a second time. The PRESIDENT had also met with the insect on one occasion only, at Mickleham, Surrey. Mr. MORRIS said his examples had been taken on *Echium vulgare* L., which of course is the normal food plant, both by sweeping and at the roots. Mr. A. A. ALLEN added that in his experience the species did occur sporadically, he had taken it on three, or perhaps four occasions, obtaining some six specimens or so each time.

Eublemma parva Hübn. was reported at light on the night of 20th July by Mr. J. L. MESSENGER.

The aberration of *Callimorpha jacobaeae* L. exhibited by Mr. Eldon Ellison prompted a query by Dr. B. J. MACNULTY whether this form was as rare as we suppose. He suggested that most lepidopterists obtained their series early in their collecting career and seldom bothered with the insect again. This suggestion arose from the fact that when breeding the species during the war he collected some 30 larvae from scattered localities and bred out a number of the aberration.

Mr. ELDON ELLISON disagreed with the suggestion; he said it was a very distinct form, very noticeable when the moth is at rest. Further, he had watched for the aberration but till now had never met with it.

A paper, "Some faunistic and Distributional Problems in the British Coleoptera" was read by Mr. A. A. ALLEN and was followed by an interesting discussion.

13th AUGUST 1959.

Mr. R. M. MERE, *Vice-President*, in the Chair.

The death was announced of Mr. A. W. Richards, M.A., B.Sc.

EXHIBITS.

Mr. R. M. MERE—Two larvae of the scarce moth *Perizoma sagittata* F. (Geometridae) taken ten days previously on *Thalictrum flavum* L. (Common Meadow Rue) in East Anglia.

Mr. F. D. BUCK—An example of *Dermestes peruvianus* Cast. (Col., Dermestidae) taken in his flat at Canonbury, N. London, during July 1959. He read a note.

Mr. J. O. T. HOWARD—Eggs of *Pterostoma palpina* Clerck (Lep., Notodontidae), laid by a Dorking, Surrey, female taken at light on 8th August. Third instar larvae of *Stauropus fagi* L. (Lep., Notodontidae), progeny of a female taken at light near Lyndhurst, Hants., on 18th July. A series of *Harpyia bifida* Brahm (*hermelina* Goeze) bred from a female taken at light last year at Dorking, with a twig of aspen carrying a number of cocoons of the species. A series of *Agrotis ripae* Hübn. (Lep. Noctuidae), bred from larvae taken in September 1958 on the S.W. Pembrokeshire coast, showing little difference from the Kentish race. Two specimens of *Eupithecia linariata* Schiff. (Lep., Geometridae), bred from Dungeness, Kent, larvae. Melanic specimens of *Ectropis bistortata* Goeze (Lep., Geometridae), one each of the spring and summer brood, from Dorking, found to be rather scarce in this locality. Two of the melanic aberration *humperti* Humpert of *Pseudobourmia punctinalis* Scop. (Lep., Geometridae), also from Dorking, found to be rather plentiful in this locality, perhaps 30% of the population.

Dr. C. G. M. DE WORMS—Lepidopterous larvae from the E. Suffolk sandhills including *Macroglossum stellatarum* L. (Sphingidae) and *Cucullia asteris* Schiff. (Noctuidae).

Mr. E. E. J. TRUNDELL—(1) Four aberrations of *Spilosoma lubricipeda* L. (*menthastri* Esp.) (Lep., Arctiidae), with a typical specimen for comparison. Three were taken this year at light in Shorne, Kent. One example, a lined aberration, approached ab. *walkeri* Curt. (2) A dark aberration of *Dasychira pudibunda* L. from the same locality, also with a typical specimen for comparison.

Mr. H. C. HUGGINS—Several cases of Lepidoptera and Mollusca to illustrate his talk.

COMMUNICATIONS.

Mr. HUGGINS reported *Plusia interrogationis* L. (Lep., Plusiidae) at mercury vapour light at Westcliff-on-Sea, Essex, on 2nd August. It was the leaden form and had last occurred in the south of England in 1955. On the same night *Eurois occulta* L. (Lep., Noctuidae) came to light. *E. occulta* L. was also reported to have occurred at Ham Street, Kent, two weeks previously.

Just over a week ago Mr. H. A. KENNARD had seen a migration of *Plusia interrogationis* L. in southern Denmark.

Two more *Eublemma parva* Hübn. were reported by Mr. J. L. MESSENGER in his trap at Weybridge, Surrey, on 24th July. None of his lepidopterist neighbours had seen the species and the occurrence appeared to be local. Other members, however, reported it from Folkestone, Kent, and from Devon.

Six *Colias croceus* Fourc., all males, had been seen near Amberley, Sussex; four of them had been caught and as they were in fresh condition it was assumed they had bred here. One was reported from Chislehurst, Kent, on 19th July, another in N. Wales early in July, and some half dozen, all males, had been noted in the Scilly Isles.

Surprise was expressed by one member that he had seen no *Vanessa cardui* L. (Lep., Nymphalidae) this year, but several members agreed it was scarce this season.

Mr. R. M. MERE said that on 8th August he had taken *Heterographis oblitella* Zell. (Lep., Crambidae) in his mercury vapour trap at Chiddingfold, Surrey. Details of recent records of this insect were given by Mr. HUGGINS.

Acherontia atropos L. (Lep., Sphingidae) was reported from Kingsbury, N.W. London.

An interesting paper, "A Naturalist in the Kingdom of Kerry", was read by Mr. H. C. HUGGINS. (See *Trans.*, p. 176.)

27th AUGUST 1959.

The PRESIDENT in the Chair.

The death was announced of Mr. H. D. SWAIN, M.A., F.R.E.S.

EXHIBITS.

Mr. C. KEITH-JOHNSTON—A case of set specimens of Lepidoptera taken in his garden in Finchley Road, London, N.W.3, situated about a mile north of Finchley Underground Station. Among them were *Dicycla oo* L. and *Cucullia absinthii* L. (Noctuidae), and *Scopula marginepunctata* Goeze and *Rhodometra sacraria* L. (Geometridae).

Mr. T. R. EAGLES—A specimen of the beetle *Chrysolina sanguinolenta* L. (Chrysomelidae) taken on the Princes Risborough, Bucks., field meeting, 23.viii.59.

Mr. A. E. GARDNER—The following Coleoptera taken by Mr. F. T. Vallins and himself in Scotland between 2nd and 14th August. (1) *Miscodera artica* (Payk.) (Carabidae), Cromdale Hills. (2) Larvae and living adult males of the "Timberman" *Acanthocinus aedilis* (L.) (Cerambycidae), Insh. (3) *Rhagium inquisitor* (L.) (Cerambycidae), Loch an Eilean. He also showed a series of the dragonfly *Sympetrum nigrescens* Lucas (Libellulidae) from Loch an Eilean, a new inland locality from the species. All localities are in Inverness-shire.

Mr. and Mrs. T. G. HOWARTH—Some larvae of *Stauropus fagi* L. (Lep., Notodontidae) in their final instar. They had been exhibited the previous meeting by Mr. J. O. T. Howard when they were in their third instar. There were two forms, one very dark purplish or blackish-brown, the other the more usual paler reddish-brown. Mr. Howarth then read some notes on the final ecdysis of the larva and drew attention to the way the larva extricated its long thoracic legs from its old skin, giving the time taken for this complex operation.

COMMUNICATIONS.

The LIBRARIAN announced the addition to the library of (1) *Bumblebees* by John B. Free and Colin G. Butler. (2) *Key to the names of the British Butterflies and Moths* by R. D. MacLeod. (3) The first two fascicles of *Alexandor*, a new French magazine dealing with Lepidoptera.

Mr. C. N. HAWKINS said he had seen a fresh specimen of *Vanessa atalanta* L. (Lep., Nymphalidae), and the President said he had also seen one or two. The President added that *Coenonympha pamphilus* L. (Lep., Satyridae) seemed to be unusually abundant this year. Mr. Eagles said that he had also noticed this at the Princes Risborough meeting. Several members spoke of the abundance of wasps this year. Mr. Howarth said they had attacked the moths in his mercury vapour trap. If they stung the moths in the abdomen it appeared to have no effect, but a sting in the thorax was fatal; often they bit the abdomen in two. Other members complained that wasps had removed the abdomens from the moths on their setting boards.

Referring to his visit to Scotland, the President said he had been surprised to see many Burying Beetles in the light trap. He reported taking the larva of *Anarta melanopa* Thunb. (Lep., Noctuidae) on the Cairngorms.

Preliminary reports of the following field meetings were given: Princes Risborough, Bucks., and Halling, Kent, by Messrs Eagles and Hammond respectively.

10th SEPTEMBER 1959.

The PRESIDENT in the Chair.

The deaths were recorded of Mr. F. T. Grant and Mr. R. Eldon Ellison.

The President announced that the Council had recognised the long and valued services of Mr. T. R. EAGLES by appointing him an Honorary Member.

EXHIBITS.

Mr. S. WAKELY—(1) Larvae of *Eumichtis adusta* Esp. (Lep., Noctuidae) from a Yorkshire female. (2) A series of seven *Evergestis extimalis* Scop. (Lep., Pyralidae) taken on the Higham, Kent, field meeting, 9.viii.59, together with living larvae of the same species found at the same place, 9.ix.59, feeding on the seeds of *Diplotaxis tenuifolia* (L.) DC. (3) Living larvae of *Ethmia funerella* F. (Lep., Hyponomeutidae) found near Canterbury, Kent, 30.viii.59, feeding on *Symphytum officinale* L. (Comfrey), together with a series of the moth from his collection.

Mr. M. G. MORRIS—A specimen of *Gymnetron collinum* (Gyll.) (Col., Curculionidae) taken on *Linaria vulgaris* Mill. (Toadflax) on the Halling, Kent, field meeting, 30.viii.59. He also showed examples of the other species in the genus which are associated with *Linaria*: *G. linariae*

(Panz.) and *G. antirrhini* (Payk.). The last named often abounds on the plant.

Mr. A. S. WHEELER—A cocoon of *Saturnia pavonia* L. (Lep., Saturniidae) with two exit holes for the moth.

COMMUNICATIONS.

Reports of the field meeting to Halling, Kent and of the visit to East Malling Research Station were given by Mr. M. G. MORRIS.

Comments on the activity of Lepidoptera recently appeared to indicate that *Colias croceus* Fourc. (Pieridae) was building up to a big emergence. There was also a good summer brood of *Lycaena phlaeas* L. (Lycaenidae). Among the moths there was a remarkably good emergence of *Leucania pallens* L. (Noctuidae).

Mr. T. R. EAGLES queried whether anyone had seen the Milkweed butterfly this year, but the only response was a reference to a report in a Devon newspaper.

Mr. P. F. SHENTON, A.R.P.S., showed a remarkable and interesting series of stereoscopic slides in colour under the title of "Three Dimensional Photography". The slides consisted of entomological, botanical, and ornithological subjects.

24th SEPTEMBER 1959.

The PRESIDENT in the Chair.

The death was announced of Mr. H. V. Line.

A welcome by the President was extended to Dr. E. A. G. Duffey of the Nature Conservancy.

EXHIBITS.

Mr. S. WAKELY—(1) Five examples of *Pammene aurantiana* Staud. (Lep., Tortricidae) taken at Mickleham, Surrey, on 26th July and 1st August last, a species first recorded for Britain in 1957. (2) Single specimens of *Pandemis cinnamomeana* Triets. (Lep., Tortricidae) and *Blastobasis lignea* Wals. (Lep., Blastobasidae) bred from larvae found on larch on the Box Hill field meeting on 2nd May. (3) Two aberrations of *Eurrhynx hortulata* L. (Lep., Pyralidae) with the black markings suffused together instead of standing out distinctly as in typical examples—both taken in his garden at Camberwell, S.E. London. A typical example was shown for comparison.

Mr. B. GOATER—(1) Third instar larvae of *Laphygma exigua* Hübn. (Lep., Noctuidae) bred from ova obtained from a female taken at Freshwater, Isle of Wight, 31.viii.59. (2) Fourth instar larvae of *Dasychira fascelina* L. (Lep., Lymantridae) bred from ova obtained in Dorset, 19.vii.59.

Mr. A. E. GARDNER—The following local species of Coleoptera taken at Wood Walton Fen, Hunts., 19.vii.59: *Chrysolina menthastri* (Suff.) and *C. graminis* (L.) (Chrysomelidae) and *Platystomos albinus* (L.) (Platystomidae).

Mr. N. HAMMOND—The spider *Oxyopes heterophthalmus* Latr. The specimen, which was about three-quarters grown, was taken on the Chobham, Surrey, field meeting on 12th September. According to Mr. D. J. Clark of the British Museum (Nat. Hist.), who confirmed the determination, this species has been taken previously in Britain in one particular area only of the New Forest, Hants, and has not been recorded since 1917.

The LIBRARIAN announced that La Société entomologique suisse had presented Vol. I of *Insecta Helvetica* dealing with Plecoptera.

Preliminary reports were given of the following field meetings: Chobham, Surrey, 12th September, by Mr. R. M. Mere; Farningham, Kent, 20th September, by Mr. J. Chalmers-Hunt.

COMMUNICATIONS.

Dr. C. G. M. DE WORMS spoke of his recent visit to the Scilly Isles and to Tresco Abbey. There was an extraordinary abundance of *Vanessa atalanta* L. (Lep., Nymphalidae) and about a dozen *Colias croceus* Fourc. (Lep., Pieridae) were seen including one ab. *helice* Hübn. Several members told of the abundance of *V. atalanta* L. in different parts of the country. For example it was swarming in the Swansea area of S. Wales and near Penzance, Cornwall. Mr. T. R. EAGLES said that Mr. J. Hillaby had seen several near the top of Scaw Fell Pike in the Lake District.

At Aldeburgh, Suffolk, *Leucania albipuncta* F. (Lep., Noctuidae), *Blastobasis lignea* Wals. (Lep., Blastobasidae) and a moth thought to be *B. decolorella* Woll. had been taken. In N. Devon vast numbers of *Macroglossum stellatarum* L. (Lep., Sphingidae) had been observed.

Mr. S. WAKELY said that earlier in the year he had taken the larvae of *Vanessa atalanta* L. and all were attacked by Hymenoptera. The primary parasite was a species of *Microgaster* and there were three species of hyper-parasites.

Dr. E. A. G. DUFFEY read a paper on "Nature Conservation" with particular reference to its work in East Anglia. This was illustrated by coloured slides, many of which depicted parts of Wood Walton Fen in Huntingdonshire.

The PRESIDENT showed coloured slides of his recent visit to Aviemore, Inverness-shire, and in particular Loch Garten where a pair of ospreys were nesting.

8th OCTOBER 1959.

The PRESIDENT in the Chair.

The President extended a welcome to Dr. J. Ramsbottom.

EXHIBITS.

There was an exhibition of fungus collected the two previous days at Epping Forest, Essex, at Banstead Woods, Surrey, and at Enfield, Middlesex. Only 22 species were shown and most of these were growing

on trees. The reason for the scarcity was the long uninterrupted drought.

The most interesting were a fine example of *Volvaria bombycina* (Pers.) Fr. on a beech tree in Epping Forest, *Bolbitius titubans* (Bull.) Fr. among Sphagnum moss in Epping Forest, *Psilocybe ericaea* (Pers.) Fr. from Banstead Woods, a large clump of *Polyporus hispidus* Fr. on beech in Epping Forest, and sections of *Fomes ulmarius* Cooke cut to show the stratoose tubes, Banstead Woods and Epping Forest.

Mr. F. D. BUCK—An example of *Agabus uliginosus* (L.) (Col., Dytiscidae) from Wood Walton Fen, 7.vi.59, together with a map showing the known distribution.

Mr. B. GOATER—Larvae of *Eupithecia pimpinellata* Hübn. (Lep., Geometridae) on *Pimpinella saxifraga* L. from Mill Hill, Middlesex.

Mr. T. R. EAGLES—(1) About a thousand dead imagines of the fly *Thaumatomyia notata* Meig. (Chloropidae). He referred to his exhibit of 26th September 1957, when a swarm of about 50,000 entered a room in his house at Enfield, Middlesex (see *Proc. S. Lond. ent. nat. Hist. Soc.*, 1957: 17). In September 1958 the invasion had been less, but this year it was much worse than in 1957. Several neighbouring householders had suffered in the same way. (2) The plant *Datura stramonium* L. (Thorn-apple) found growing in his garden. This plant has recently received attention in the national press. He suspected that the seed occurred as an impurity in imported bird seed.

COMMUNICATIONS.

Referring to Mr. Eagles' exhibit, Dr. RAMSBOTTOM said he thought a lot of unnecessary fuss had been made over the Thorn-apple. It does occur quite commonly in some places and he believed it to be a native British plant. Mr. S. N. A. JACOBS said he had always associated the plant with pig sties and in Sussex he had often found it growing against the walls of such places.

Comment was also made on the swarming of *Thaumatomyia notata* Meig., when attention was drawn to the widespread swarming of this fly two years ago. Once more Dr. DE WORMS made observations on recent occurrences in Lepidoptera—a number of butterflies were still about, *Colias croceus* F. (Pieridae) was seen at Woking, Surrey, a few days previously and *Vanessa atalanta* L. (Nymphalidae) was noted flying in a steady stream southwards. *Herse convolvuli* L. (Sphingidae) appeared to be commoner in the Isle of Wight than elsewhere, but several captures in the south of England were mentioned. *Leucania albipuncta* Schiff. (Noctuidae) and *Palpita unionalis* Hübn. (Pyralidae) were both seen in the past few days.

In Sussex the previous Sunday (4th October) Mr. JACOBS said several *Lycaena phlaeas* L. (Lycaenidae) had been seen but only one *Vanessa atalanta* L. The PRESIDENT agreed that *L. phlaeas* L. was the commoner species at the present time.

Dr. RAMSBOTTOM gave a talk on "Fungi" which he supported with a number of coloured slides and coloured transparencies.

31st OCTOBER 1959.

THE ANNUAL EXHIBITION—RECORD OF EXHIBITS

Mr. G. J. ASHBY (on behalf of the ZOOLOGICAL SOCIETY OF LONDON)—Living invertebrates as follows: *Pandinus imperator* (Thor.), Imperial scorpion with young; *Latrodectus mactans* F., the Black Widow Spider; four species of bird-eating spider, *Tapinauchenius plumipes* Koch, *Avicularia avicularia* L., *Psalmopoeus cambridgei* Poc. and *Brachypelma vagans* Auss.; a Centipede with eggs, belonging to the genus *Scolopendra*; some Millipedes (Diplopoda); *Orxines mackloti* (Sauss.), Javan Stick Insect; a Praying Mantis belonging to the genus *Sphodromantis*; *Rhomaleum micropterum* Bed., Lubber Locust; and *Coenobita rugosa* H. Edwards, the Land Hermit Crab.

Mr. A. A. ALLEN (visitor)—Two examples of *Cercyon laminatus* Sharp (det. J. Balfour-Browne) (Col., Hydrophilidae), a species new to Britain and taken in August this year at Blackheath, S.W. London, at mercury vapour light. The species was described from Japan but has occurred in recent years in the Hamburg and Berlin areas of Germany, also at light. The insect is very distinct from other species of British *Cercyon*, by its pitchy-yellow-brown colour with only the head black, the large eyes, the rounded or obtuse hind angles of the pronotum and the deeply impressed striae and the strong puncturation.

Mr. K. E. J. BAILEY—(1) Lepidoptera as follows: *Pararge aegeria* L. s.sp. *egerides* Staud., a bleached male taken near Ryton on Dunsmore, War., 19.vii.59; *Erebia aethiops* Esp., five males including a bleached form, and three females from a series taken at Arnside, Westmorland, 26.vii.59; *Maniola jurtina* L., two bleached males, Cotswolds, 26.vi.59; *Aphantopus hyperantus* L., four males and a female ab. *arete* Mill., Oversley Wood, Worcs., 12.vii.59; *Argynnis cydippe* L., a male taken at Tubney Woods, N. Berks. (near Oxford), 27.vi.59, this is only the second specimen seen by the exhibitor in this area since the war; *Polygonia c-album* L., a male with a dull, dark mahogany ground colour, Oversley Wood, Worcs., 12.vii.59; *Aglais urticae* L., a male extreme ab. *nigra* Tutt, bred under natural conditions from a larva found in Birmingham, War., August 1959; *Apatura iris* L., three males and three females, bred, Surrey, 1959; *Lysandra coridon* Poda, a male taken in a field near Oxford, over 14 miles from the nearest known locality, August 1959; also a female ab. *caeca* Courv., and two female abs. *antidiscoelongata* B. & L.; a male ab. *postcaeca* B. & L., all from the Cotswolds and Chilterns, August 1959. (2) Temperature experiments carried out on Lepidoptera at the Department of Clinical Research, Queen Elizabeth Hospital, Birmingham, during August and September 1959. A series of 75 *Aglais urticae* L. bred from four separate broods collected over a wide area in the Midlands. These are aberrations ranging from nearly normal specimens to extreme phenocopies identical with ab. *nigra* Tutt. They were produced by exposing the pupae during the critical period of wing pattern development to

low temperature. Exposure to low temperature was arranged to simulate several successive frosty nights as might occur in nature. Each exposure was for 12 hours in every 24, the remainder of the time being at room temperature. The exhibitor believes that the critical period extends over the first two days of pupal life. A temperature of -8° C. was used. A low mortality rate (two per cent) was observed. Each brood behaved similarly and about five per cent of treated pupae produced normal imagines. Some 30 per cent produced ab. *ichnusoides* Selys-Long., about 20 per cent produced ab. *nigra* Tutt, the remainder producing intermediates of varying degrees between the former and normal specimens. All controls were normal. A short series was exposed for seven days continuously, the mortality rate in this case being 33 per cent. Apart from the above variations, a reduction in hindwing area was observed.

Dr. J. V. BANNER—*Coenonympha tullia* Müll. ab. *philoxenus* Esp., taken in Westmorland; aberrations of the following species: *Aphantopus hyperantus* L., taken in Westmorland, *Lysandra coridon* Poda, taken in Sussex and *Zygaena trifolii* Esp. taken in Kent; also a short series of *Orthosia gracilis* Schiff. from the Lake District.

Mr. and Mrs. E. L. BOLTON—A selection of interesting aberrations of Rhopalocera taken during 1959: *Polyommatus icarus* Rott., a melanic male somewhat resembling the aberration *ultramelaina* B. & L. of *Lysandra coridon* Poda, taken by Mrs. Bolton in Surrey; also a male underside resembling the *L. coridon* aberration *sagittata* Courv., Isle of Purbeck, July 1959; and a female underside ab. *transiens* Oberth., with spots elongated towards striation, Isle of Purbeck, July 1959; *Lysandra coridon* Poda, female upperside with possible homoeosis on the right forewing, Isle of Purbeck, July 1959; *Euchloë cardamines* L., male underside ab. *kutokovi* Krul., with greatly increased green marbling on the underside hindwings, bred 30.iii.59, Surrey, and a male upperside having black outer border extension to base of forewing tips or inner angle of wing, also having an orange streak across white portion below the orange tips, Sussex, May 1959; *Argynnis selene* Schiff., two males exhibiting the same abnormality as *Lysandra coridon* Poda ab. *decrescens* B. & L. and showing mal neurulation, Sussex, May 1959.

Mr. S. R. BOWDEN—Hybrids of British *Pieris napi* L. and the Swiss ab. *bryoniae* Ochs. (F_2 of F_1 backcross to *bryoniae*): form *sulphurea* Schöyen in butterflies only one-quarter *P. napi* in constitution. Since only half the insects in the parental backcross broods carried *sulphurea*, the form was not certain to re-appear, as in fact it did in at least two 1958 broods out of five. The more direct route to the same goal, through the F_2 hybrid and its backcross to *bryoniae*, yielded in 1954 rather weak insects. Although the 1958 broods appear very vigorous and have been successfully paired among themselves as well as backcrossed again to *bryoniae*, they yet retain certain disadvantageous hybrid characters. In particular, a proportion of individuals are still in prolonged, or even fatally prolonged, diapause. The original *P. napi* parent in 1957 was

albino as well as *sulphurea*; albinism is present, though weakly expressed, in one of the three broods shown.

Mr. C. S. H. BLATHWAYT—Lepidoptera from Weston-super-Mare, Somerset, except where otherwise stated: *Alcis* (*Cleora*) *repandata* L., a varied selection all taken in his garden at light; *Leucania albipuncta* Schiff., two specimens taken at light on 6 and 8.x.59; *Laphygma exigua* Hübn., three examples taken during 1959, one in the Sychnant Pass, N. Wales, on 8th July and the other two at Weston-super-Mare on 12th July and 27th August; *Heliothis peltigera* Schiff., three specimens taken on 17.vii.59, 14.ix.59 and 1.x.59; *Nycterosia* (*Nyctosia*) *obstipata* F., three specimens taken on 22.vii.59, 1.viii.59 and 30.ix.59; *Palpita* (*Margaronia*) *unionalis* Hübn., two specimens taken on 14 and 15.x.59.

Mr. R. F. BRETHERTON—(1) Selected Lepidoptera. From Ottershaw, Surrey: *Odontesia carmelita* Esp., 16/20.iv.59; *Pseudips prasinana* L. (*bicolorana* Fuess.), June to July 1959; *Agrotis segetum* Schiff., extreme melanic aberrations, 15.vi.59 and 5.ix.59; *Cucullia absinthii* L., 7.vii.59; *Heliothis virescens* Hufn. (*dipsacea* L.), 4.vi.59; *Dicycla oo* L. ab. *renago* Haw., 7.vii.59; *Haplotis venustula* Hübn., 16.vi.59; *Sterrhia sylvestris* Hübn., 26.vi/16.vii.59; *Rhodometra sacraria* L., 25.viii.59; *Nycterosia obstipata* F., 9 and 25.viii.59; *Phigalia pilosaria* Schiff. (*pedaria* F.) ab. *monacharia* Staud., 27.ii/7.iii.59; *Selenia lunaria* Schiff., 5.vi.59; *Euzophera terrebrella* Zinck., 24/26.vi.59; *Donacaula mucronellus* Schiff. 24.vi.59; *Crambus contaminellus* Hübn., 13.vii/15.ix.59. From the Chilterns, Bucks.: *Lophopteryx cucullina* Schiff., bred 23.vi.59; *Schrankia taenialis* Hübn., 11.vii.59. From the south Devon Coast, 1/3.viii.59: *Nola albula* Schiff.; *Euplagia quadripunctaria* Poda (*hera* L.); *Leucania putrescens* Hübn.; *Pyrallis costalis* F., melanic aberration; *Scoparia cembrae* Haw. From the New Forest, Hants: *Cleora cinctaria* Schiff., 2.v.59; *Semiothisa alternaria* Hübn., bred 15.vii.59; *Eilema deplana* Esp., 8.viii.59; *Alcis* (*Cleora*) *jubata* Thunb., 8.viii.59. From Chiddingfold, Surrey, 12.v.59: *Apatele alni* L. From Frensham, Surrey, 5.ix.59: *Amathes agathina* Dup. From Abinger, Surrey and Balcombe, Sussex: *Haplotis venustula* Hübn., 30.v.59 and 13.vi.59. From Hydon Ball, Surrey, 19.vi.59: *Bomolocha crassalis* F. (*fontis* Thunb.), and *Hepialus fusconebulosa* Deg. From Chobham, Surrey: *Sterrhia muricata* Hufn., 26.vi.59 and 3.vii.59: *Apoda avellana* L., 24.vi.59. From Wisley, Surrey, 7.viii.59: *Semiothisa alternaria* Hübn. From Wood Walton Fen: *Arenostola extrema* Hübn., 5.vi.59; *Eupithecia palustraria* Doubl., 6.vi.59. From West Lavington, Wilts., 3.viii.59: *Oria musculosa* Hübn. From Portland, Dorset: *Cucullia absinthii* L., bred July 1959. From West Holme, Dorset, 31.viii.59: *Crambus silvellus* Hübn. From Itchen Valley, Hants, 15 and 22.viii.59: *Gortyna* (*Hydraecia*) *petasitis* Doubl. From Wittering, Sussex, 20.vi.59: *Scopula emutaria* Hübn. From Weeting, Norfolk, 12.viii.59: *Scopula rubiginata* Hufn., *Mesotype virgata* Hufn.; *Oxyptilus distans* Zell. From Eriswell, Suffolk, 5.vi.59: *Lithostege griseata* Schiff. (2) Examples of exceptional extra broods of Lepidoptera: from Ottershaw, Surrey: *Phragmatobia fuliginosa* L., 15.ix.59;

Caradrina morpheus Hufn., 3.x.59; *Ourapteryx sambucaria* L., 15.x.59; *Pseudoboarmia* (*Boarmia*) *punctinalis* Scop., 23.viii.59; *Cleora rhomboidaria* Schiff., 3.x.59; *Sterrha subsericeata* Haw., 9, 10 and 25.viii.59; *Sterrha dimidiata* Hufn., 14.viii.59; *Scopula imitaria* Hübn., 2.ix.59; *Anaitis efformata* Guen., Gen. III, 3.x.59; *Ectropis bistortata* Goeze, Gen. III, 13.ix.59. From Witley, Surrey: *Comibaena pustulata* Hufn., 3.x.59.

THE BRITISH MUSEUM (NAT. HIST.), DEPARTMENT OF ENTOMOLOGY—Three cases illustrating parallel modification in facies in the geographical races of the genus *Euploea* F., involving *core* Cramer, *algea* Godart., *sylvester* F., *midamus* L., and *tulliolus* F., from Ceylon, Sikkim, Burma, the Andamans, Sumatra, Java, Luzon, Celebes, Amboina, New Guinea and Australia. Two cases illustrating mimetic associations (Batesian mimicry) amongst South American butterflies. Three cases giving examples of mimicry in Rhopalocera as illustrated by R. C. Punnett in his book "Mimicry in Butterflies". A spirally segmented bilateral gynandromorph, right side female, left side male, of *Samia cecropia* L.

Group Capt. L. W. BURGESS—A series of butterflies, illustrating mimicry, from Ceylon assessed as rarities, taken between February and April 1959. Two common species, *Delias eucharis* Drury and *Polydorus aristolochiae* F. s.sp. *ceylonicus* Moore which resemble the rarer models were also included for comparison. The exhibit consisted of: *Prioneris sita* Felder, *Delias eucharis* Drury, *Colotis fausta* Oliv. s.sp. *fulvia* Wallengren, *Polydorus jophon* s.sp. *jophon* Gray, *P. aristolochiae* F. s.sp. *ceylonicus* Moore, *Appias indra* Moore s.sp. *narenda* Moore, *Phalanta alcippe* Cramer s.sp. *ceylonica* Manders, *Huphina nadina* Luc. s.sp. *cingala* Moore and *Halpe decorata* Moore.

Mr. S. E. W. CARLIER—(1) Some moths which have been double brooded this year in Warwickshire: *Harpyia* (*Cerura*) *furcula* Clerck, first brood probably in May, seven examples of a second brood came to mercury vapour light, 7.viii.59, Wilmcote; *Hypena proboscidalis* L., first brood 16th and 29th June, examples of the second brood came to sugar on ash leaves on 20th September, Wilmcote; *Archips* (*Cacoecia*) *oporana* L. (*podana* Scop.), first brood, Coughton Wood, 19th June, second brood males and one female, Wilmcote, 1st September, the female being very light; *Eucosma expallidana* Haw., first brood 27th June and was worn by mid July, second brood 3rd and 6th September; both broods came to mercury vapour light at Wilmcote; *Olethreutes* (*Argyroploce*) *lacunana* Schiff., first brood at Solihull on 24th May and was getting very worn at Wilmcote by 26th June, but quite fresh specimens occurred again on 24th July and continued in lessening numbers and poorer condition until 9th August, no more were seen until 3rd September when fresh specimens came to mercury vapour light, reappearing again on the 6th. Thus it appears there were three broods: at the end of May, during the third week of July and in early September. (2) Aberrations probably caused by damage to pupae.

Sterrrha aversata L., right side normal, left side with costal margins hollowed in middle, particularly on the hindwing, only two thickened transverse lines on forewing and only one on hindwing, at lights in shop window, Solihull, 16.viii.58, between 10.45 p.m. and 11.15 p.m. B.S.T. *Noctua pronuba* L., forewings of normal size, hindwings only $\frac{3}{8}'' \times \frac{1}{4}''$. This specimen made flights of about eight feet, rising to not more than one foot after flying some six feet, it landed on its back facing the direction from which it had come, Solihull, 12.vi.43.

Mr. G. A. COLE—(1) On behalf of Captain B. M. B. Cole, R.A.O.C., a series of *Polyommatus icarus* Rott., taken on the island of Benbecula, Outer Hebrides, 1-10.vii.59. (2) Short series of the following Lepidoptera taken or bred during 1959: *Euphyia rubidata* Schiff., bred from a female taken on the Isle of Portland, Dorset, 5.vii.58; *Lampropteryx otregiata* Metcalf, caught near Dawlish, south Devon, 8-9.v.59; *Epirrhoë galiata* Schiff., bred from a female taken in north Cornwall, 26.vii.59; *Ortholitha mucronata* Scop., *Psolos coracina* Esp., and a single melanic *Lophopteryx capucina* L., all from Aviemore, Inverness-shire, 1-7.vi.59.

Major A. E. COLLIER—Aberrations of Rhopalocera taken or bred in Surrey during 1959: *Maniola jurtina* L. female ab. *postaurolancea* Leeds, and a male ab. *anommata* Verity; *Coenonympha pamphilus* L. an albino male and abs. *caeca* Oberth. and *excessa* Leeds; *Aphantopus hyperantus* L. ab. *cabeau* Pionneau and ab. *lanceolata* Shipp; *Lycaena phlaeas* L. a female ab. *auroradiata* B. & L. which also has markings similar to the aberration *caerucuncata* B. & L. of *Lysandra coridon* Poda, and a male ab. *auroradiata* B. & L.; the foregoing being all taken in the Cranleigh district. Bred specimens of *Lysandra coridon* Poda, two males ab. *discreta* Tutt. (Pl. II, fig. 2) and two ab. *syngrapha* Kefer., one *inframarginata* B. & L. and the other *punctata* Tutt.

Mr. S. COXEY—(1) Lepidoptera from various localities as follows: Romney Marsh, Kent: *Hydraecia hucherardi* Mab., *Tholera popularis* F., *Nycterosia obstipata* F. Barton Mills, Suffolk: *Plusia gamma* L., melanic. Bolton, Lancs.: *Eumichtis adusta* Esp., richly coloured. Wicken, Cambs.: *Nonagria dissoluta* Treits, pale forms. Goyt Valley, Derby: *Venusia cambrica* Curt., melanic. Savernake Forest, Wilts.: *Minoa murinata* Scop. Windermere, Westmor.: *Eustroma reticulata* Schiff., bred. Reigate, Surrey: *Euphyia cuculata* Hufn., bred. Clitheroe District, Lancs.: *Cerapteryx graminis* L., aberration. (2) Specimens of *Arctia caja* L. consisting mainly of five inbred generations from a Hampshire female taken in August 1958. A few examples from crossing the inbred stock with Bolton, Lancs., wild males in August 1959, were also shown. The aberrations included both red and yellow forms.

Mr. R. M. CRASKE—Aberrations of Rhopalocera taken during recent years: *Argynnis selene* Schiff., a series of 24 insects taken by R. M. and the late J. C. B. Craske in three successive years in various localities, including extreme melanic, banded, suffused and confluent forms; *A. euphrosyne* L., three males (a) an extreme melanic form with beautiful marginal rays on the forewings, (b) a cream ground colour form and



ANNUAL EXHIBITION, 31st October 1959.

1. *Colias croceus* Fourc., male underside aberration, Clifford Craufurd. 2. *Lysandra coridon* Poda ab. *discreta* Tutt., Major A. E. Collier. 3. *Arctia caja* L., aberration, A. J. Wightman. 4. *Xanthorhoe montanata* Schiff., P. J. Gent. 5. *Melitaea cinxia* L., underside aberration, Mrs. N. I. Watson. 6. *Biston betularia* L., melanic aberration, Comdr. G. W. Harper. 7. *Lycaena phlaeas* L., D. H. Walker. 8. *Cerapteryx graminis* L., Austin Richardson. 9. *Xanthorhoe fluctuata* L., Dr. J. V. Dacie.

(c) an extreme confluent form; also three females, a melanic form and two heavily banded forms; *Coenonympha pamphilus* L., two male underside ab. *castanea* Leeds and ab. *obsoletissima* Leeds, three females (a) a very extreme upperside of deep russet brown colour which extends over the whole insect including the fringes, head and body, (b) a smoky coloured upperside and (c) an underside similar to (b); a halved gynandromorph, right side male, possibly unique in this species; *Plebejus argus* L., an extreme aberration male underside "albapostradiata", a series of five females including abs. "ultrinaequalis", "antisinispotdextradiata" and *caeca* Grund; *Polyommatus icarus* Rott., a male ab. *radiata* Tutt and a male ab. *transiens* Oberth.; *Lysandra coridon* Poda, a series of 18 specimens including males ab. *pulla* B. & L. and *antidigitata* B. & L., and females ab. *pulla* B. & L., *inaequalis* Tutt, *nigrescens* B. & L., *ultraradiata* B. & L., *striata* Tutt and *caeca* Courv.: *Ochlodes venata* Br. & Grey, a female upperside with the angulate series of fulvous spots on the forewings extended to the marginal chevrons and a typical female for comparison. [The aberrational names in inverted commas follow the system of Bright and Leeds (1938, A *Monograph of the British aberrations of the Chalkhill Blue Butterfly*, *Lysandra coridon* Poda) which being transferred to another species are not valid—EDITOR.]

MR. CLIFFORD CRAUFURD—The following Lepidoptera: *Colias croceus* Fourc., a male underside aberration from Bishops Stortford, Herts., 15.ix.59 (Pl. II, fig. 1) with a typical underside for comparison; *Thecla betulae* L. (Pl. III, fig. 4), an underside aberration bred from Chiddingfold, Surrey, stock which emerged 20.vii.24 with a typical underside for comparison; *Argynnis aglaia* L., females from Aviemore, Inverness-shire, 10 and 25.vii.59 and examples from the New Forest, Hants, 11.vii.22; *Galleria mellonella* L., examples from Bishops Stortford, 10, 17 and 25.viii.59; ? *Nonagria geminipuncta* Haw. taken on 21.vii.59 and 7.viii. 59; *Noctua comes* Hübn., a series taken on the following dates 11, 12, 16 and 19.vii.59, and which included some ab. *curtisii* Newman.

MR. N. ST. JOHN CUMMING—(1) Lepidoptera: *Maniola tithonus* L., a female captured during August 1954 in Lostwithiel, Cornwall. This specimen shows a larger than usual number of spots on the fore and hindwings. On the forewings there are two white-pupilled spots below the apical spot, making three in all; on the hindwings five spots show on the upperside and six on the underside. *Eumenis semele* L., a dwarf male measuring 37 mm. from apex to apex of forewings, captured 12.viii.53 at Friday Wood, Colchester, Essex. Normal male specimens measure approximately 53 mm. *Catocala nupta* L., taken in September 1928 by Mr. Desmond Cox while it was resting on a telegraph pole in Colchester. This interesting aberration has chocolate brown hindwings instead of the normal red. The specimen was kindly loaned by Mr. Cox for the exhibition. (2) Coleoptera: *Prionus coriarius* (L.) taken in Colchester, during September 1958 by Mr J. Firmin; *Gnorimus nobilis*

(L.), a male also captured in Colchester, 1.vii.58 resting on a rose bush.

Dr. J. V. DACIE—(1) *Bupalus piniaria* L. (Pl. III, fig. 3), a gynandrous specimen caught on the wing at Oxshott, Surrey, 31.vi.58, but not previously exhibited. The ground colour is female as is the pattern on the whole of the right side and the lower two-thirds of the left hindwing. The pattern of the left forewing and the upper third of the left hindwing is male. The left antenna is male and the right female. *Pseudopanthera macularia* L. (Pl. III, fig. 6), a specimen with asymmetry of the wing pattern, caught on the wing in Durfold Wood, Surrey, 31.v.58. The pattern of the markings of both left wings is normal, but that of the right side abnormal. The two small fenestrations in the right forewing were present when the specimen was caught. *Xanthorhoë fluctuata* L., a dwarf specimen with abnormal wing markings (Pl. II, fig. 9), bred from a larva obtained at Wimbledon, Surrey, in October 1958. *Agrotis exclamationis* L., an extreme form caught in a mercury vapour trap at Wimbledon, 22.vi.56. The stigmata are enlarged, particularly the claviform, and almost fused. (2) A selection of moths obtained at Walberswick, Suffolk, 2-14.viii.59: *Celerio galii* Schiff., a worn female caught in a mercury vapour trap on the night of 5-6th August; *Macroglossum stellatarum* L., nine specimens bred from larvae found on the foreshore between Walberswick and Dunwich, they emerged between 8-22nd September, one additional specimen was bred from a newly deposited ovum which took 53 days to complete its life cycle; *Parascotia fuliginaria* L., a male specimen caught in a mercury vapour trap on the night of 2nd August; *Ellopiia fasciaria* L. ab. *prasinaria* Schiff., a female specimen caught in a mercury vapour trap on the night of 2nd August.

Mr. C. H. DIXON—Various Lepidoptera: *Colobochyla salicalis* Schiff., Ham Street, Kent, 31.v.59; *Lygris prunata* L., bred ab. *ovis*, Micheldever, Hants, 19.viii.58; *Discoloxia blomeri* Curt., Marlow, Bucks., 3.vii.59; *Xanthorhoë quadrifasciata* Clerck, Marlow, 3.vii.59; *Hadena caesia* Schiff. and *H. capsophila* Dup., bred from larvae, Tramore, Ireland, 10.vii.58; *Agrotis trux* Hübn. and *Cryphia muralis* Forst., Portland, Dorset, 8.vii.59; *Hepialus sylvina* L. and *Entephria flavicinctata* Hübn. Rannoch, Inverness-shire, 22.vii.59; *Apamea furva* Schiff. and *Noctua (Triphaena) sobrina* Boisd., Aviemore, Inverness-shire, 25 to 28.vii.59; *Aporophyla lutulenta* Schiff. ab. *luneburgensis* Freyer, *Apamea assimilis* Doubl., *Actebia praecox* L., *Trichiura crataegi* L., *Celaena haworthii* Curt. and *Hapalia alpinalis* Schiff., Dalwhinnie, Inverness-shire, 31.vii to 3.viii.59; *Gortyna (Hydraecia) petasitis* Doubl., Micheldever, 25.viii.59; *Luperina testacea* Schiff., Micheldever, 24.viii.59, a very small insect; *Lithophane leautieri* Boisd., I.o.W., 9 to 11.x.59; *Leucania albipuncta* Schiff., one from Micheldever, 4.x.59, and another from I.o.W., 10.x.59; *Palpita unionalis* Hübn., I.o.W., 11.x.59. Also shown were the following unusually late occurrences in a mercury vapour trap at Micheldever: *Leucania comma* L., 4.x.59; *Ectropis bistortata* Goeze, 1.x.59; *Lygephila pastinum* Treits., 1.x.59; and *Spilosoma lutea* Hufn., 4.x.59.

Mr. R. C. DYSON—(1) A selection of Lepidoptera bred during 1959: *Orgyia recens* Hübn., from Yorkshire ova; *Apatele rumicis* L., series bred on sawfly, much larger than wild specimens; *Arenostola elymi* Treits., bred from pupae and larvae collected on the Sussex coast; *Hadena lepida* Esp., from larva collected on *Silene maritima* With., near Camber, Sussex; *Erebia aethiops* Esp., bred from larva taken in June in Westmorland; *Eumenis semele* L., bred from larva collected in Hampshire. (2) A selection of Lepidoptera taken during a week in Westmorland: *Erebia epiphron* Knoch., *Coenonympha tullia* Müll., *Aricia agestis* Schiff., *Aphantopus hyperantus* L. from N. Cumberland with much reduced spotting, *Parasemia plantaginis* L. with ab. *hospita* Schiff., *Nudaria mundana* L., *Anaplectoides prasina* Schiff., *Polia hepatica* Clerck, *Apamea monoglypha* Hufn., two of the black form, *Plusia bractea* Schiff., *P. festucae* L., *Phothedes captiuncula* Treits., *Scopula ternata* Schr., *Sterrhia muricata* Hufn., *Discoloxia blomeri* Curt., *Entephria caesiata* Schiff., *Crambus furcatellus* Zett. from the summit of Red Screes. (3) Heterocera taken at Freshwater, I.O.W., 9, 10 and 11.x.59: series of *Rhizedra lutosa* Hübn., *Dasypolia templi* Thunb., and single specimens of *Heliothis armigera* Hübn., *Leucania albigutta* Schiff. and *Nycterosia obstipata* F.

Mr. T. R. EAGLES and Mr. F. T. VALLINS—About 20 species of fungus. Owing to the long spell of dry weather in the Summer and early Autumn fungus was quite exceptionally scarce. The exhibit included: (1) Birch seedlings with mycorrhizal roots. The mycelium of the fungus forms a sheath which completely envelops the root. This mycelium can absorb and pass on to the tree food supplies of a type which the roots by themselves cannot deal with. Thus the association is of benefit to the trees. (2) Ergots of *Molinia caerulea* (L.) (Purple-moor-grass). These are dark drum-stick like bodies 7 to 10 mm. long and similar to or perhaps the same as *Claviceps purpurea* (Tul.), ergot of rye, the cause of much illness in man and cattle by a form of poisoning. (3) *Psilocybe ericaea* (Pers.) Fr. This was growing profusely on the bottom of a dried-up pond. (4) *Tubaria paludosa* (Fr.) Karst. growing in sphagnum moss. (5) *Tricholoma sulphureum* (Bull.) Fr. found at the edge of a pond. (6) *Calocera cornea* Fr. growing on a tree stump. (7) *Clitocybe gilva* (Pers.) Fr., an uncommon species found in a damp spot normally almost inaccessible. Nos. (1) to (6) from Epping Forest, Essex; No. (7) from Bayford, Herts.

Mr. T. R. EAGLES—A flowering spray of the plant *Hyoscyamus albus* L. grown in the open from seed collected in The Rif (Spanish Morocco). Probably the hot dry summer had helped. The plant differs from the British species *Hyoscyamus niger* L. (Henbane) in that the middle leaves have petioles.

Mr. N. T. EASTON—The following Lepidoptera: an albinistic male *Thymelicus sylvestris* Poda, Pamber Forest, Hants, 3.viii.57; an albinistic male *Maniola jurtina* L., near Blean, Kent, 3.vii.59, several more were seen in this hillside colony; a heterochroic gynandromorph

Pieris napi L. \times ab. *bryoniae* Ochs. F₁ hybrid, bred 11.ix.58 from a *P. napi* male and an ab. *bryoniae* female; a hybrid *Pieris*, the female parent being the progeny of a pairing between an F₁ *P. napi* \times *bryoniae* male and a *bryoniae* female.

Mr. L. J. EVANS—(1) A brood of *Colias croceus* Fourc., the progeny of a female captured at St. Aygulf on the French Riviera, showing males and females in equal numbers; 50 per cent. of the females are ab. *pallida* Tutt, the rest are typical. (2) *Ematurga atomaria* L., a short series of feral males from Cannock Chase, Staffs., F₁ and F₂ broods from Cranham, Glos., and an F₁ brood from the Wyre Forest, Salop; *Enargia paleacea* Esp., a series showing variation in ground colour and markings, from the Wyre Forest; *Apatele alni* L., two from the Wyre Forest and two from Sutton Park, N. War., one of which is melanic; *Chloroclysta miata* L., a series from the Wyre Forest; *Leucania pallens* L., specimens of the second brood which was rather common this year at Trickleby Coppice, N. War.; *Amathes glareosa* Esp., from Trickleby Coppice and the Wyre Forest.

Mr. R. FAIRCLOUGH—Lepidoptera caught and bred during 1959: A number of each of *Hydraecia lucens* Frey., Witherslack, Westmor., and *H. paludis* Tutt, to show the difficulty of identification; determinations were by Mr. W. H. T. Tams. A series of *Lampropteryx otregiata* Metc., taken in August near Machylleth, Montg. (see *Ent. Rec.*, 71: 229), with one subsequently bred. A series of *Lithophane leautieri* Boisd. from Seaford, Sussex; four *Endromis versicolora* L. from the Wyre Forest, Salop; a *Harpyia* (*Cerura*) *bicuspis* Borkh., from Balcombe, Sussex; an *Aplasta ononaria* Fuess., taken in August at Dungeness, Kent; a *Leucania albipuncta* Schiff., taken 8th October, the first record for the home trap at Leigh, Surrey; one *Lithosia quadra* L. from a mercury vapour trap in Merionethshire, 28th July; a heavily marked underside of *Melitaea cinxia* L. bred from I.O.W., and two examples of an unusual second brood; *Argynnis euphrosyne* L., August, Merionethshire; *Comibaena pustulata* Hufn., September, Balcombe, Sussex, a series of *Gymnancyla canella* Hübn., bred from Camber, Sussex; a series of *Hypercallia christiannana* L. (*citrinalis* Scop.), bred, Kent; series of each of three *Hyponomeuta* species, *H. cognatella* Hübn., *H. plumbella* Schiff. and the rare *H. irrorella* Hübn., bred from larvae and pupae collected on the same bushes on the same day in Kent; *Gracillaria tringipennella* Zell., bred I.O.W.; *Nepticula argyropeza* Zell., from the garden aspens; two examples of the local *Anania stachydalis* Zinck. with the common *Perinephele sambucalis* Schiff. to show the difference; an unusual grey form of *Hypochalcia ahenella* Hübn. with two normal examples from the North Downs; and one *Gibberifera simplana* F.R., from Kent.

Mr. J. FIRMIN—A series of *Thetidia* (*Euchloris*) *smaragdaria* F., reared from larvae obtained in South Essex, April 1959; three specimens of *Bapta distinctata* H.-S., taken at street lamps in Colchester, Essex, April 1957; a male *Argynnis paphia* L., captured in Wiltshire in July

1959, showing partial albinism—a white spot on each wing; shown with this specimen was another male *A. paphia* L. which had hindwings more darkly coloured than usual, and which was taken in the same locality; a series of *Haplotis venustula* Hübn., captured in West Essex, June 1959; three male and three female specimens of *Selenia lunaria* Schiff., reared at Colchester in 1959 from ova laid by a female taken in a mercury vapour trap; a series of *Lithostege griseata* Schiff., captured in West Suffolk, June 1958; two male and two female *Thecla betulae* L., reared from ova found in Berkshire, the males having unusually large forewing markings; a male aberration of *Opisthagraptis luteolata* L., captured at mercury vapour light, Colchester, July 1959, with the hindwing white and unmarked, and some of the brown forewing markings absent; a series of *Hadena compta* Schiff., reared from larvae found on sweet william at Colchester, one male with the forewing colour of a deep brown shade; a male aberration of *H. compta* Schiff., reared at Colchester, with white markings extending in suffusion over most of the forewings; a series of *Cirrhia ocellaris* L., reared from larvae found in West Suffolk.

Mr. BRIAN E. FROST—The following list of photographs represents a cross section of work undertaken during 1959. In the main photographs were taken on a quarter plate field camera adapted to $3\frac{1}{2}'' \times 2\frac{1}{2}''$; those taken in the field were photographed with an Exakta 127 single lens reflex camera. Flash is used almost exclusively for artificial lighting. The photographs shown were: final instar larva of *Thetidia smaragdaria* F. collected in South Essex; newly emerged imago of *T. smaragdaria* F. on the larval food-plant, *Artemisia maritima* L. (Sea Wormwood); final instar larva of *Deilephila elpenor* L. on *Chamaenerion angustifolium* (L.) Scop. (Rose Bay Willow Herb); ovum of *Colias croceus* Fourc. on lucerne leaf, Colchester, July 1959; final instar larva of *C. croceus* Fourc. feeding on lucerne; pupa of *Apatura iris* L. on sallow leaf (larva obtained from West Sussex); pupa of *Strymonidia w-album* Knoch, reared from ovum obtained from female captured in North Essex; final instar larva of *S. w-album* Knoch; extreme close-up of head of full-grown larva of *Cerura vinula* L.; *Gastropacha quercifolia* L., freshly emerged imago on hawthorn twig; *Callophrys rubi* L., imago on silver birch leaf; *Thecla quercus* L. imago and final instar larva; fully grown larva of *Erebia epiphron* Knoch, reared by Mr. J. Firmin from ovum laid by Perthshire female; larva of *Limenitis camilla* L. found in wood at Colchester; *Strymonidia pruni* L., female imago pictured on blackthorn at Monks Wood, Hunts., June 1959; ovum of *Gonepteryx rhamni* L. found in Sussex, 24 hours before emergence of larva; *Argynnis selene* Schiff., male at Hog Wood, Sussex, May 1959; large close-up of *Sphinx ligustri* L. pupa.

Mr. A. E. GARDNER—The following Odonata: *Sympetrum nigrescens* Lucas taken at Loch an Eilean, Inverness-shire, 12.viii.59, a new locality for the species nearly 50 miles further inland than previous records; *Somatochlora arctica* (Zett.), Insh, Inverness-shire, 5.viii.59; *Sympetrum striolatum* ab. nov. from Wood Walton Fen, Hunts, 18.x.59, this is a

unique specimen exhibiting extensive black markings on the dorsal and lateral surface of the 8th to 10th abdominal segments.

Mr. P. J. GENT—*Xanthorhoë montanata* Schiff., with the usual band across the forewing reduced to a small area around the orbicular (Pl. 11, fig. 4); *Opogona subcervinella* Walk., bred from a larva found feeding on the outside of a banana.

Col. H. C. R. GILLMAN—*Oria musculosa* Hübn. (Pl. III, fig. 5) from Tilshead, Wilts., 6.viii.53, a gynandromorph, taken at light at about 10.30 p.m.

Mr. BARRY GOATER—(1) Lepidoptera bred from ova or feral larvae, Newtonmore, Inverness-shire, August to September 1958: *Apatele menyanthidis* View., a variable series bred May 1959, some of the females especially well marked, with very dark hindwings. *Amathes depuncta* L., ova obtained in September 1958, hatched in 13 days, and the young larvae immediately went into hibernation in dry, hollow grass stems. They were kept in a cool refrigerator until 25.ii.59, when they were transferred to a warm room and soon became active, feeding up quickly on *Rumex* sp., the moths emerging in May; some larvae succumbed to mould in their hibernacula. *Diarsia dahlia* Hübn., larvae fed up during the winter on *Rumex*, moths emerging February to March 1959. *Coenocalpe lapidata* Hübn., overwintered as ova in refrigerator, were brought into the warmth of a room on 25th February and hatched 8th to 11th March, the larvae fed up on *Ranunculus acris* L., refusing *R. repens* L., imagines emerged May to June 1959; many F₂ ova were obtained but very few hatched, one male moth emerging in September. (2) Lepidoptera from various English localities: *Cryphia perla* Schiff., dark coloured specimens from Mill Hill, Middx.; *C. muralis* Forst., a pale specimen from Freshwater, Isle of Wight, with specimens from Rye, Sussex, for comparison; *Agrotis exclamationis* L., heavily streaked specimens, a male from Mill Hill and a female from Camber, Sussex; *Xylomiges conspicillaris* L., a male specimen, Mill Hill, taken in a mercury vapour light trap, 14.v.59, an extraordinary capture, far from its normal range; *Gortyna (Hydraecia) petasitis* Doubl., bred specimens from Watford, Herts., where the pupa is locally abundant, with caught examples for comparison; *Arenostola brevilinea* Fenn, part of a series including ab. *sinelinea* Farn, taken in abundance at dusk on the Norfolk Broads, July 1959; *A. extrema* Hübn., part of a series taken at paraffin light, Wood Walton Fen, Hunts., 6.vi.59; *Stilbia anomala* Haw., series from the New Forest, Hants., August 1959; *Tiliacea aurago* Schiff., bred examples, one typical, the other very orange, approaching ab. *unicolor* Tutt, from larvae beaten from *Acer campestre* L. flowers, with caught specimens of the two forms for comparison.

Mr. A. L. GOODSON—Lepidoptera from the Rothschild-Cockayne-Kettlewell collection all taken by himself: *Leucania lythargyria* Esp. ab. *marginata* Tutt, Tring, Herts., 26.vi.45; *Apatele leporina* L. ab. *sagittata* Lempke, Tring, 25.vi.59; *Cirrhia gilvago* Schiff. ab. nov., Tring, 7.xi.58; *Agrotis exclamationis* L. banded ab., Tring, 15.vi.59; *Plusia gamma* L. ab. *nigricans* Spul., Tring, 16.ix.59; *Biston betularia*

L. ab. nov., Tring, 25.vi.59; *Mitochrista miniata* Forst. ab. *flava* Forst., New Forest, Hants, 8.vii.59; *Colotois pennaria* L. ab. *bifidaria* Haw., Tring, 9.xi.58; *Gonodontis bidentata* Clerck, with the hindwing not scalloped, Tring, 12.v.59; *Opisthagraptis luteolata* L. ab. *intermedia* Harr., Tring, 12. viii.59; *Thalera fimbrialis* Scop., Dungeness, Kent, 22.vii.59.

Mr. G. HAGGETT and Mr. A. J. WIGHTMAN—*Arenostola fluxa* Hübn. (*hellmanni* Evers.), a series from Mildenhall, Suffolk, July 1959, comprising a rich variety of high coloured forms; *A. extrema* Hübn., (*concolor* Guen.), a series from Wood Walton Fen, Hunts., June 1959; *A. brevilinea* Fenn, a series from Catfield, Norfolk Broads, bred from larvae collected in June 1959; also examples of *Parastichtis suspecta* Hübn., *Noctua* (*Triphaena*) *sobrina* Boisd., *Plusia bractea* Schiff., *Amathes glareosa* Esp., *A. depuncta* L., *A. castanea* Esp., *A. xanthographa* Schiff., *Apamea monoglypha* Hufn., *Diarsia dahlia* Hübn., *Procus strigilis* Clerck, *P. latruncula* Schiff., *Hydraecia crinanensis* Burr., *H. oculea* L., *H. lucens* Frey., *Hyppa rectilinea* Esp., *Cerapteryx graminis* L., *Apatele leporina* L., *Lithomoia solidaginis* Hübn., *Enargia paleacea* Esp., all from Aviemore, Inverness-shire; *Antitype flavicincta* Schiff., from Pulborough, Sussex; *Leucania obsoleta* Hübn. from Wood Walton Fen, Hunts.; *Anepia irregularis* Hufn., from the Breck Country on the Norfolk/Suffolk border; *Hadena caesia* Schiff., from the Isle of Man; *Dryobotodes protea* Schiff., from Freshwater, Isle of Wight; *Amathes glareosa* Esp., from Freshwater; *Apamea assimilis* Doubl., Dalwhinnie, Inverness-shire; *Hydrillula palustris* Hübn. a male and three females from Wood Walton Fen larvae; *Aporophylla nigra* Haw., from Freshwater; *Lithophane leautieri* Boisd., from the Isle of Wight; *Dasypolia templi* Thunb., from Freshwater; *Rhizedra lutosa* Hübn., from Freshwater; *Eumichtis lichenea* Hübn., both pale and dark forms from the Isle of Wight; and *Arctia caja* L., aberration from Aviemore (Pl. II, fig. 3).

Mr. H. E. HAMMOND—(1) Black larvae (melanic) from various sources. These include specimens from places where industrial melanism is in full evolution and others from non-industrial areas. The opinion of the exhibitor is that (apart from industrial melanism) true melanism in larvae is extremely rare. During 15 years he has handled alive some 100,000 larvae from most counties and in securing these his collaborators must have handled at least several times that number, yet only about 20 melanic larvae have been amongst this vast quantity. An estimate is given, based on personal experiences, of 20 melanic examples per million larvae. Specimens chosen for exhibition are: *Habrosyne pyritoides* Hufn., Sutton Park, War.; *Saturnia pavonia* L., Aviemore, Inverness-shire; *Agrotis exclamationis* L., Pulborough, Sussex; *Mamestra brassicae* L., Wallingford, Surrey, and another from Birmingham, War.; *Ceramica pisi* L., Birmingham; *Hadena conspersa* Schiff., Poldhu Cove, Corn.; *Semiothisa liturata* Clerck, Cannock Chase, Staffs.; *Erannis defoliaria* Clerck Sutton Park; *Crocallis elingvaria* L., Stoke Ferry, Norf.; *Biston betularia* L., Kinver Edge, Staffs.; *Cleora*

rhomboidaria Schiff., Birmingham; and *Alcis repundata* L. also from Birmingham. (2) An example of J. W. Heslop-Harrison's well-known *Abraxas grossulariata* L. from Newcastle, Northumb., and one each of the famous *Arctia caja* L. and *Lasiocampa quercus* L. bred by the late S. Gordon Smith in recent years. (3) Larval colour forms of *Gonodontis bidentata* Clerck. It was pointed out that the highly coloured larvae are mostly to be found in non-industrial areas where lichens abound on trees and shrubs on which the larvae feed. Those shown are from Loch Torridon, R. & Crom.; Aviemore, Inv.; Keswick, Cumb.; The Wrekin, Salop; West Sussex; Thetford, and Stoke Ferry, Norf.; and also a series from Cannock Chase, Staffs., where melanism is rampant in this species, and a series from the exhibitor's garden in Birmingham. The local Birmingham larvae are now showing considerable darkening but it is of interest to note that whilst Birmingham is a heavily smoke-laden area only two melanic imagines have come to the exhibitor's knowledge, both reared from pupae collected whilst gardening. These two moths are now in the collection of Col. W. Bowater.

Comdr. G. W. HARPER—(1) Five species of common Scottish Lepidoptera with their rare or uncommon rural melanic aberrations as follows: *Craniophora ligustri* Schiff., ab. *nigra* Tutt, from Argyll.; *Orthosia gothica* L., extremely rare melanics, the only two specimens seen among 13,000 individuals examined over seven years; *Biston betularia* L., a very remarkable and rare unnamed melanic male with black front wings and white hindwings from Argyll. (Pl. II, fig. 6), and the first recorded ab. *insularia* Th.-Meig. taken at Aviemore, Inv.; *Phigalia pilosaria* Schiff. (*pedaria* F.), very rare melanic and an intermediate form, also first records for northern Scotland; and *Ortholitha chenopodiata* L., a rare melanic from Grantown, Inv. (2) Some species taken or bred from the Highlands and Islands in 1959: a variable series of *Euxoa cursoria* Hufn. from Findhorn, Moray Firth; a pale series of *Polia nebulosa* Hufn. from Argyll.; a series of *Tholomiges turfosalis* Wocke also from Argyll.; an interesting aberration of *Abraxas grossulariata* L. from the Isle of Canna, Inner Hebrides; a bred series of the Shetland race of *Eupithecia venosata* F., from the Isle of Unst, Zetland; a bred series of *Coenocalpe lapidata* Hübn., from Newtonmore, Inv.; and a series of *Zygaena purpuralis* Brunich, from the Isle of Rhum, Inner Hebrides.

Mr. M. W. HARPER—*Polyommatus icarus* Rott., a short series from the Isle of Canna, Inv., showing very marked obsolescence of the underside spotting, compared with some examples from the Isle of Lismore, Argyll., also some aberrations taken in Surrey, May to June 1959; a short series of *Maniola jurtina* L. race *splendida* White from the Isles of Canna and Rhum, Inv., showing an increase of orange in both sexes on the uppersides, whilst the undersides show an increase of grey pigmentation, undersides of the typical form shown for comparison; *Coscinia cribraria* L., a short series taken in July 1959 in Dorset; a single example of *Plusia ni* Hübn., captured flying in daylight near Dorking, Surrey, 10.viii.59; a short series of the pale form of *Polia nebulosa* Hufn.,

taken in Argyll., June 1959, compared with some darker specimens taken in Middlesex, July 1958; also from Argyll., some examples of the buff form of *Spilosoma lubricipeda* L., June 1959; a short series of *Hadena conspersa* Schiff., from the Isle of Canna, 27.vi.59, showing a form darker and with slightly more yellow pigmentation than normal; also from the Isle of Canna, two examples of *Hadena caesia* Schiff., 1.vii.59, a series of *Plusia festucae* L., bred from larvae and pupae found on *Iris pseudacorus* L., an example of the typically dark form of *Agrotis exclamationis* L., 27.vi.59, and finally an example of a female *Hepialus humuli* L., with no markings on the forewings, this was subsequently shown not to be a racial form but an aberration; single examples of aberrations of *Orthosia stabilis* Schiff., 31.iii.57, *Orthosia gothica* L. ab. *gothicina* H.-S., showing a yellow replacement of the Hebrew character, 4.iv.57, and lastly *Diarsia festiva* Schiff. ab. *conflua* H.-S., 4.vii.59, all taken in Inverness-shire; a short series of *Plusia chryson* Esp., bred from larvae found on *Eupatorium cannabinum* L. in Hampshire, May 1959; two specimens of *Euxoa obelisca* Schiff. taken on chalk cliffs, I.o.W., together with a short series of *Gnophos obscurata* Schiff. taken from the same locality, August to September 1959; examples of a dark and well marked form of *Tholomiges turfosalis* Wocke found in abundance on marshy ground in Argyll. Also shown were aberrations of the following moths: *Xanthorhoe montanata* Schiff., Inv., 5.viii.59, and Sussex, 18.vi.56; *Epirrhoë alternata* Müll., Inv., 2.vii.54; *Carsia sororiata* Hübn. (*paludata* Thunb. nec L.), Inv., 6.viii.57; *Lomaspilis marginata* L., Kent, 2.vi.56, and Argyll., 23.vi.59; *Oporinia christyi* Prout, Sussex, 30.x.57; a bred series of *Bupalus piniaria* L., Inv., September 1958, showing extreme variation in the females from a white background colour to a melanic or sooty grey colour; an unusual form of *Ematurga atomaria* L. from a wood in Hampshire, May 1959; examples of the dark forms of *Euphyia bilineata* L. from the Isles of Rhum and Canna, and of *Epirrhoë galiata* Schiff., June 1959, from the Isle of Lismore, Argyll.; aberrations of *Zygaena trifolii* Esp., May 1959, including an ab. *lutescens* Cockerell from an east Surrey locality, 2.vi.59; lastly a short series of *Zygaena purpuralis* Brunnich, 22.vi.59, Isle of Lismore, and 2.vii.59, Isle of Rhum.

Mr. C. R. HAXBY—Examples of local Lepidoptera including *Thymelicus lineola* Ochs. and *Lygephila pastinum* Treits., from Wood Walton Fen, Hunts., 5.vii.59; *Lithomoia solidaginis* Hübn., Broomhead Moor, Yorks., 13.viii.59; *Thalera fimbrialis* Scop., Kent, 8.vii.59, and *Anagoga pulveraria* L., Westmorland, 9.v.59.

Mr. T. J. HONEYBOURNE—Larvae, pupae and imagines of the second brood of *Nymphalis io* L., and larvae of *Rothschildia jacobaeae* Walker from Argentina.

THE HOPE DEPARTMENT OF ENTOMOLOGY, OXFORD—An exhibit illustrating aposematic coloration in African insects: (1) An assemblage of Lycid beetles (comprising nine species) captured on one day (23.iii.17) at Itigi, on Central Railway, about 150 miles east of Tabora, East Africa, by Capt. G. D. Hale Carpenter (see *Proc. ent. Soc. Lond.*, 1917: lvii-lix).

All the species are bright orange with black marks on thorax and tips of elytra. (2) Synaposematic series collected by Capt. G. D. Hale Carpenter in the East African localities listed below, and discussed and figured in his book "A Naturalist in East Africa": (a) Tanganyika Territory: Lulanguru, 17 miles west of Tabora. 16 species belonging to the Coleoptera (Cerambycidae, Lamiidae, Telephoridae, Cetoniidae); Hemiptera Heteroptera (Capsidae); Lepidoptera (Tinaeioidea); Diptera (Tachinidae); Hymenoptera Symphyta (Tenthredinidae) and Parasitica (Braconidae) all of which could easily be mistaken for lycid beetles. (b) Tanganyika Territory: Itigi, about 150 miles east of Tabora. Coleoptera (Lycidae and Lamiidae); Hymenoptera (Braconidae). (c) Uganda: Lutoboka, Sesse Is., N.W. Victoria Nyanza. Coleoptera (Lycidae, Cerambycidae, Hispididae); Hemiptera Heteroptera (Coreidae, Reduviidae); Hymenoptera (Pompilidae); Lepidoptera (Lithosiidae). (d) Uganda: Foot of Kakindu Hill, about 20 miles west of Victoria Nyanza. Coleoptera (Lycidae, Lamiidae); Diptera (Asilidae).

Mr. J. O. T. HOWARD—A series of the grey form of *Trichiura crataegi* L., bred from larvae taken in early June 1959 at Aviemore, Inv.

Mr. and Mrs. T. G. HOWARTH—A selection of the Lepidoptera collected during June in Spain and presented to the Department of Entomology, British Museum (Nat. Hist.). It included a specimen of *Charaxes jasius* L. that had been bred from an egg, the resulting larva having been exhibited at the meeting of this Society on 9th July (see p 15), and an undescribed aberration of *Zygaena nevadensis* Ramb.; also an untouched and unposed photograph of a Robinson mercury vapour light trap taken in the late afternoon in situ at Arkley, Herts., in 1954, showing specimens of *Cilix glaucata* Scop. and *Eupithecia centaureata* Schiff. at rest on the trap amongst bird droppings. The trap was visited regularly by robins, sparrows and blackbirds which usually ate, soon after dawn, any moths at rest on the trap or within the immediate vicinity. On this occasion the trap had not been moved or covered during the earlier part of the day.

Mr. G. E. HYDE—Various Lepidoptera as follows: *Argynnis euphrosyne* L., four examples, one female heavily marked with black on all wings, Northants. stock, bred September 1959; *Apatura iris* L., female, bred November 1958; *Aglaia urticae* L., aberration; *Coenonympha tullia* Müll., from Yorkshire and Westmorland; *Apatele alni* L., a dark form; *Spilosoma lutea* Hufn., striated forms.

Capt. R. A. JACKSON—A striking aberration of *Erynnis tages* L., believed to be unique. On the forewings the normal double band of black spots is entirely absent, giving the effect of a whitish patch pervading the central area of the wings and with the blackish veins showing up clearly (Pl. III, fig 1). On the hindwings a band of whitish wedge-shaped spots borders the broad dark outer marginal area, whilst the small white spots and black outer marginal line found in normal specimens is absent; this is replaced by a serrated white border and fringe. The insect which is in perfect condition was taken asleep on a flowerhead near Codford St. Mary, Wilts., 29.v.59.



ANNUAL EXHIBITION, 31st October 1959.

1. *Erynnis tages* L., aberration, Captain R. A. Jackson. 2. *Eupithecia phoeniceata* Ramb., Dr. C. G. M. de Worms. 3. *Bupalus piniaria* L., Dr. J. V. Dacie. 4. *Thecla betulae* L., underside aberration, Clifford Craufurd. 5. *Oria musculosus* Hüb., gynandromorph, Col. H. C. R. Gillman. 6. *Pseudopanthera macularia* L., Dr. J. V. Dacie. 7. *Luperina testacea* Schiff., Austin Richardson. 8. *Agapetes galathea* L., pathological aberration, Norman A. Watkins.

Mr. S. N. A. JACOBS—A drawer of microlepidoptera from the Valais district of Switzerland, taken during July 1959.

Major F. L. JOHNSON—Several cases of exotic Lepidoptera. (1) Illustrating the *Ornithoptera priamus* L. species group from the Moluccas and the Solomon Islands. (2) *Ornithoptera* from New Guinea including a female *O. alexandrae* Roths. the largest known butterfly. (3) Lepidoptera illustrating warning coloration from Africa, South America, the West Indies and some Pacific Islands. (4) Lepidoptera exhibiting leaf mimicry, etc., from Africa, India and the East Indies.

Mr. ARTHUR W. JOLLANDS—A selection of coloured slides. (1) Fungi: *Phallus impudicus* Pers., photographs taken at Shalden near Alton, Hants, 1957, in November when there were no flies to eat the spore-containing gleba; *Mutinus caninus* Fr. (Dog Stinkhorn), taken at Alton in October 1958; *Clavaria pistillaris* L., Alton, October 1958; *Laccaria amethystina* (Vaill.) Cke., Alton, October 1958; *Lepiota procera* (Scop.) Fr. (Parasol Mushroom), an edible species taken at Winchfield, Hants, October 1958; *Xylaria polymorpha* Grev., Bentworth, Hants, October 1958; *Cyathus striatus* Hoffm. (Bird's Nest Fungus), Bentworth, October 1958; *Lycoperdon echinatum* Pers., taken at Bentworth, October 1958. (2) British Birds: *Picus viridis* L. (Green Woodpecker), birds nesting in an alder tree at Frensham, Surrey, and taken July 1959, only six pictures were secured in 40 hours watching, the young were fed by the regurgitation process at intervals of about two and a half to three hours; *Dendrocopos major* (L.) (Greater Spotted Woodpecker), taken at Beech near Alton, 1.vi.59, unlike *P. viridis* these birds feed by the ordinary method at ten minute intervals; *Alcedo atthis* (L.) (Kingfisher), Ovington, Hants, July 1959; *Vanellus vanellus* (L.) (Lapwing), Ovington, May 1957; *Fulica atra* L. (Coot), newly hatched young at Selbourne, Hants, August 1958; *Aegithalos caudatus* (L.) (Long-tailed Tits), a nest in a laurel hedge at Alton, 1958; *Motacilla cinerea* Tunstall (Grey Wag-tails), situated under a footbridge over a stream at Ovington, 1957; *Columba palumbus* L. (Wood Pigeon), Ovington, 1958; *Strix aluco* L. (Tawny Owl), Beech near Alton, 1958, one was introduced from another nest and was accepted by the adult birds and reared successfully. (3) Mammals: *Erinaceus europaeus* L. (Hedgehog), an adult at Beech 1958, and another slide of young in a nest with eyes closed and spines still quite soft, Sheldon, Hants, 7.vii.59; *Vulpes crucigera* Bechstein (Fox) ten-day-old cub found wandering about in a wood at Shalden, 7.iv.58, in the daytime and apparently lost; *Sorex araneus* L. (Common Shrew) seen searching frantically for food during the daytime at Hartley Mauditt, Alton, 1957; *Apodemus sylvaticus* L. (Wood Mouse), Beech, 1958; *Mus musculus* L. (House Mouse), Alton, 1957; *Muscardinus avellanarius* L. (Dormouse), a female which had taken possession of a tit-box at Beech, 1959. (4) Invertebrates: a nest of *Vespa vulgaris* (L.) (Common Wasp), sectional, showing comb layers, etc., hanging naturally at the bottom of a hedge at Farringdon near Alton, 1957; *Helix aspersa* Müll. (Large Garden Snail), Alton. (5) Reptiles and Amphibians: *Vipera berus* (L.) (Adder or Viper), a 25-inch female

basking in the sun at Bentworth, 1957; *Natrix natrix* (L.) (Grass snake), one slide of a male and another of eggs taken at Alton, 1956; *Coronella austriaca* Laurenti (Smooth Snake), a male in the New Forest, Hants, 1958; *Anguis fragilis* L. (Slow Worm), a female at Frensham, Surrey; *Bufo calamita* Laurenti (Natterjack Toad), a male at Frensham, 1958. (6) Eight monochrome prints of mammals and birds: *Vulpes crucigera* Bechstein (Fox), cubs patiently waiting for the vixen to bring their supper, they are looking and listening in the still of the night, Alton, 9.v.54; *Meles meles* L. (Badger), two cubs foraging for earthworms outside their sett at Cranleigh, Surrey, about one hour after sunset, 1951; *Erinaceus europaeus* L. (Hedgehog), foraging for earthworms at Cranleigh, a flashlight photograph taken at night, 1951; *Tyto alba* (Scop.) (Barn Owl), these owls nested annually in a stable loft at Ovington, taken July 1955; *Cygnus olor* (Gmel.) (Mute Swan), taken in the evening at Alton, May 1952, with the sunlight behind the subject; *Corvus monedula* L. (Jackdaw), these birds nested every year in a loft over a garage and stables at Shalden near Alton, the sticks had piled up over many years to a height of three feet, photograph taken in 1954; *Meles meles* L. (Badger), taken at 10.30 p.m. (B.S.T.) at Cranleigh, 1.vi.51, the occupants of this sett had been watched every night for about four months to obtain this picture; *Athene noctua* (Scop.) (Little Owl), taken in the early evening at Alton, 1952, when the young came out of the nest hole and sat on branches.

Mr. C. KEITH JOHNSON—Moths from a London garden three miles north of Marble Arch, taken at light this year.

Dr. H. B. D. KETTLEWELL—Lepidoptera from the Rothschild-Cockayne-Kettlewell collection collected by himself: *Lasiocampa quereus* L. ab. *feminecolorata* Cockayne, Yorks., 1957; *Ammogrotis lucerneae* L. race *renigera* Steph., Unst., Shetland Islands, August 1959; *Amathes xanthographa* Schiff., dark form or race, Unst., August 1959; *A. glareosa* Esp. s.sp. *edda* Staudl., Unst, August 1959.

Mr. M. J. LEECH—Lepidoptera from Formby, Lancs.: series of *Polyommatus icarus* Rott., showing minor aberrations in the underside markings; *Lycaena phlaeas* L., a specimen with the hindwing margin straw coloured; *Laotioë populi* L., a specimen with ochreous colour on the hindwings in place of the normal reddish colouration; bred series of *Philudoria potatoria* L. showing some variation in the females, and of *Agrochola lota* Clerck; *Amathes triangulum* Hufn., an aberration with reduced markings; series of *Euxoa cursoria* Hufn., *Gortyna micacea* Esp., including an example of the melanic form, *G. flavago* Schiff., *Eumichtis lichenea* Hübn., *Anchoscelis litura* L., *Aporophyla lutulenta* Schiff., *Pyrrhia umbra* Hufn., *Euchoeca nebulata* Scop., *Hydraelia flammeolaria* Hufn., and *Hepialus hecta* L., also a large variable series of *Agrochola lychnidis* Schiff. showing various colour forms. From Witherslack, Westmor.: a bred series of *Diacrisia sannio* L. and series of *Scopula ternata* Schrank and *Sterrha muricata* Hufn. From N. Wales: bred series of *Sterrha eburnata* Wocke; a series of *Earophila badiata* Schiff; examples of F₁ and F₂ broods of *Selenia bilunaria* Esp.,

also three examples of the cross between a female *S. tetralunaria* Hufn. and a male *S. bilunaria* Schiff. (= hybr. *parvilunaria* Bartl.). From the New Forest, Hants: bred series of *Selenia tetralunaria* Hufn., summer brood. From Ghana, West Africa: a drawer of West African Hawk Moths taken in various localities in the country during 1957 and 1958.

Dr. C. H. McCLEERY—Series of two species of Heterocera taken at light at Cambridge: *Noctua (Triphaena) pronuba* L., July and August 1958-9, and *Agrochola lychnidis* Schiff., September 1959; and a short series of *Catocala electa* View., bred from ova from Germany 1957.

Miss C. A. McDERMOTT—(1) Rhopalocera taken in Finnish Lapland at Kilpisjärvi between the end of June and the beginning of July including *Erebia lappona* Thunb., *Oeneis norna* Thunb., *Argynnis freija* Thunb., and *Pieris napi* L. (2) Some *Tuberolachnus viminalis* B.d.F., Great Willow Aphids, found on willow in a sand-pit at Borough Green, Kent. (3) A female cockroach found in a greengrocer's shop in Borough Green on 29.vii.59, eggs were laid on 14.ix.59.

Dr. B. J. MacNULTY—Fifty-nine species of West African Sphingidae (Lep.) representing 25 genera.

Lt.-Col. W. B. L. MANLEY—Four species of Lepidoptera taken in his mercury vapour light trap at Otford, Kent, during 1959: *Herse convolvuli* L., 30th October; *Heliothis armigera* Hübn., 30th September; *Eublemma parva* Hübn., 21st July; and *Palpita unionalis* Hübn., 10th October.

Lt.-Col. and Mrs. MANLEY—A selection of Rhopalocera taken in France and Spain between 16th May and 15th July 1959, which included the Teruel and Granada races of *Melitaea desfontainii* Godart, varieties of *Erebia epistygne* Hübn. from Teruel, and *E. hispania* Butler and *Aricia ramburi* Verity from Granada among other species.

Mr. ROBIN MERE—A short series of *Zygaena purpuralis* Brun. and *Z. loti* Schiff. (*achilleae* Esp.) from Argyll., June 1959; a short series of *Spilosoma lubricipeda* L., with buff forewings, from Argyll., June and July 1959; an *Amathes xanthographa* Schiff. aberration from Feltham, Middx., taken from Mr. E. W. Classey's trap; a *Heterographis oblitella* Zell. taken at mercury vapour light, Chiddingfold, Surrey, August 1959; a fresh *Trigonophora flammea* Esp., taken at Mercury vapour light, Dorset, 11.x.59, believed to be only the fourth taken this century and exhibited on behalf of Messrs. E. W. Classey and Ian Lorimer; a yellow *Amathes castanea* Esp. from N.E. Hants, September 1959; a short series of *Noctua (Triphaena) comes* Hübn., from Tresco, Scilly Isles, July 1959.

Mr. J. L. MESSENGER—(1) Mimicry in Lepidoptera from Ceylon: *Papilio polytes* L. s.sp. *romulus* Cramer, three examples of the female as follows: "male" form with a normal male for comparison; "aristolochiae" form with a specimen of *Atrophaneura aristolochiae* F. f. *ceylonicus* Moore which is mimicked; and the "hector" form with a specimen of *Atrophaneura hector* L. which it mimics. *Chilasa clytia* L. f. *lankeswara* Moore, four specimens as follows: two males and a female with *Euploea sylvester* F. f. *montana* C. & R. Feld., one of the allied

species of *Euploea* which *C. clytia* mimics and f. *dissimilis* L., a male and female with *Danaus hamata musikanos* Fruh. which the latter form mimics. *Hypolimnas misippus* L., a male and female with *Danaus chrysippus* L. which is mimicked by the female. *Hypolimnas bolina* L., a male and female with *Euploea core* Cramer r. *asela* Moore one of the allied species of *Euploea* which the female mimics. *Valeria ceylanica* s.sp. *ceylanica* Feld. with *Danaus similis* L. f. *exprompta* Butler which is mimicked by the female. *Elymnias hypermnestra* L. s.sp. *fraterna* Butl., a male and female with *Danaus genutia* Cramer which the female mimics. It is worthy of note that the mimicry in connection with *Chilasa clytia* L. occurs in both sexes whilst in the species which follow it is only the female that is mimicked. (2) Various Lepidoptera taken during late 1958 and 1959: *Cirrhia gilvago* Schiff., a short bred series from east Kent which includes an extremely lightly marked female; *Oria musculosa* Hübn., a series taken in Wilts., August 1959; *Antitype xanthomista* Hübn., a series taken in south Cornwall, September 1959; *Leucania l-album* L., short series showing first and second broods taken at Portland, Dorset, and in south Cornwall, 1958-9; *Agrotis trux* Hübn. s.sp. *lunigera* Steph., a series taken at Portland in June 1959; *Leucochlaena hispida* Geyer., a series taken at Portland, October 1958; *Euplagia quadripunctaria* Poda, two specimens from south Devon, August 1959; *Sterrhia degeneraria* Hübn., a male taken at Portland, June 1959; *Nola albula* Schiff., seven specimens from Portland and south Devon, 1959; *Leucania putrescens* Hübn., two specimens from south Devon, August 1959; *L. unipuncta* Haw., a specimen from the Scilly Isles, September 1959; *Eumichtis lichenea* Hübn., three specimens of the Scilly Isles form, September 1959; *Agrotis puta* Hübn., three specimens of the Scilly Isles form, September 1959; *Crociosema plebejana* Zell., two specimens from the Scilly Isles, September 1959; *Apatele alni* L., a short series from Surrey including a second brood example taken 25.viii.59; *Eublemma parva* Hübn., three specimens taken at Witley, Surrey, June 1959; *Leucania albipuncta* Schiff., a male and female taken at Witley; *Notodonta ziczac* L., a specimen showing melanic tendency, particularly in the apical area, Witley 1959; *Arctia caja* L., a specimen with one forewing much more lightly marked than the other, Witley 1959; *Dasychira pudibunda* L., a female showing melanic tendencies, Witley 1959; *Callimorpha jacobaeae* L., two specimens with the red marking on the forewings much enlarged and partially confluent, Witley 1959; *Eurrhynx hortulana* L., a specimen with the black markings much enlarged; *Palpita unionalis* Hübn., three specimens taken at Witley, October 1959.

Mr. H. N. MICHAELIS—(1) Lepidoptera from Aviemore, Inverness-shire, including: *Eucosma nemorivaga* Tengst, *Ancyliis unguicella* L., *A. laetana* F., *Olethreutes arbutella* L., *Petrova (Evetria) resinella* L., *Pammene rhediella* Clerck, *Gelechia solutella* Zell., *Depressaria angelicella* Hübn., *Coleophora glitzella* Hof., *C. vacciniella* H.-S., *Choreutis myllerana* F., *Phylloporia bistrigella* Haw., *Leucoptera susinella* H.-S. From Llandudno district, Caer.: *Alucita spilodactyla* Curt. From

Derbyshire: *Venusia cambrica* Curt., dark forms. (2) Hymenoptera Symphyta (Sawflies). In series bred from galls on *Salix*. *Nematus (Pontania) dolichura* (Thomson, C. G.) from Malham, Yorks.; *N. (P.) viminalis* (L.) from Malham; *N. (P.) bridgmanii* (Cameron) from Malham; and *N. (P.) proxima* (Lepeletier) from Manchester, Lancs.

Mr. A. M. MORLEY—Some moths from Folkestone, Kent, taken between September 1957 and October 1959. All except one taken at mercury vapour light, or bred: *Arctia caja* L., female with spots joined on hindwing, 4.viii.59; *Trichiura crataegi* L., a pale male, 20.ix.57, being only the second taken in the district since 1927; a *Hepialus* female, apparently a variant form of *H. lupulina* L., 10.vi.59; *Simyra albovenosa* Goeze, a worn male taken 21.viii.59, there is no previous record for the Folkestone-Romney Marsh district; *Agrotis exclamationis* L., a melanic female, 13.vii.59; *Diarsia florida* Schmidt, a female taken 29.vi.58, a male was shown at the Annual Exhibition of 1956 by the present exhibitor (1957, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1956: 38); *Phlogophora meticulosa* L., a very dark specimen of the typical form, 16.v.58; *Caradrina ambigua* Schiff., two males out of 28 bred between 15.xi and 24.xii.58, the offspring of a female taken on 18.ix.58, her eggs hatched in early October; a *Procus* sp., which on dissection proved to be a form of *P. latruncula* Schiff. taken 10.vii.59; *Eublemma parva* Hübn., 17.vii.59; *Nonagria sparganii* Esp., male, 9.ix.58, there is no previous record for Folkestone; *Plusia pulchrina* Haw., ab. *v-aureum* Hübn., a male of the dark northern form taken 20.vi.59 and similar to some taken at Aviemore, Inverness-shire; a male *Cosymbia* sp., subsequently determined by Mr. R. M. Mere as a second brood *C. linearia* Hübn., disturbed by day from bushes in the exhibitor's garden, 19.vii.59; *Xanthorhoe spadicearia* Schiff., a melanic male, 19.vi.59; a male and female *Nycterosia obstipata* F. from five bred between 13 and 16.xi.58 from a few eggs laid by a female taken 15.x.58; *Colotois pennaria* L., a male rather heavily infuscated, 11.x.57; *Opisthograptis luteolata* L., a male heavily marked along the costa, taken 13.viii.56, and a female f. *emaculata* Graes.; *Menophra (Hemerophila) abruptaria* Thunb., a male, unfortunately damaged, rather dark on the forewings, darker on the hindwings, taken 1.v.58, the only darkened forms recorded from this district previously were a male and a female taken by Mr. R. W. Fairthrop in 1957; *Crambus latistrius* Haw., male, 25.vii.59, which does not seem to have been recorded in the district for a good many years.

Mr. M. G. MORRIS—A collection of Weevils (Col., Curculionidae) nearly all taken in Kent during 1959.

Mr. J. NEWTON—Four species of Gloucestershire microlepidoptera which are new to Fletcher and Clutterbuck's *Mircolepidoptera* of Gloucestershire, Parts 1-7 (1937-1943, *Proc. Cotteswold Nat. Fld. Cl.*, 26 to 28): *Gracillaria sulphurella* Haw. ab. *aurantiella* Peyer., twelve specimens were typical *sulphurella*, some of which are heavily marked with black, and twelve specimens were ab. *aurantiella*, some also darkly marked—a more detailed report appears in the 1959 *Ent. Rec.*, 71: 89; *Zeiraphera (Eucosma) rufimitrana* H.-S., eight examples; *Epinotia*

(*Eucosma*) *subsequana* Haw., eight examples; *E. (E.) fraternana* Haw. (*proximana* H.-S.), eight examples. The last three species were all on *Abies alba* Mill. (Silver Fir) (*E. subsequana* is also on spruce).

Mr. D. A. ODD—*Dasychira pudibunda* L., a dark form taken at mercury vapour light on a fine night at moderate temperature in West Sussex, 30.v.59; *Apamea monoglypha* Hufn., a variety of forms taken at sugar, Aviemore, Inverness-shire, 20.vii.59; *Eurois occulta* L., dark forms also taken at sugar, Aviemore, 20.vii.59.

Mr. G. B. OLIVER—*Argynnis paphia* L., two specimens of the F₂ brood, male primaries with long oval border spots, secondaries mainly black; female ab. *valesina* Esp., primaries blackish-brown, all usual lighter shade omitted and the outer third minus all normal spotting, with a zigzag black band across centre of wings—this specimen being slightly dwarfed—the only such example from about 300 butterflies reared. Unwanted specimens were released in local woods at High Wycombe, Bucks.

Mr. R. W. PARFITT—Heterocera taken or bred during 1959: *Dasyptolia templi* Thunb., from Swanage, Dorset; *Eumichtis lichenea* Hübn., from Swanage and Portland, Dorset; *Lithophane leautieri* Boisd., from Swanage; *Agrotis ripae* Hübn., bred from Dawlish, S. Devon, West Wittering, Sussex, and Hayling Island, Hants; *Dasyampa rubiginea* Schiff., bred from Farnborough, Hants; *Palpita unionalis* Hübn., from Swanage; *Poecilopsis lapponaria* Boisd., a bred gynandromorph, right side female and left side male.

Mr. JOHN PAYNE—Aberrant forms of *Aphantopus hyperantus* L., male, and *Pieris napi* L., female, taken in Northamptonshire, 1958.

Mr. C. J. PEARCE—Three species of Lepidoptera caught at Rowhedge, Essex: *Eurois occulta* L., 2.viii.59; *Lophopteryx cucullina* Schiff., 5.viii.59; *Phigalia pilosaria* Schiff. (*pedaria* F.), between 22.ii and 21.iii.59.

Mr. E. C. PELHAM-CLINTON—(1) Lepidoptera from St. Kilda, July 1959: *Lycophotia varia* de Vill., *Peridroma porphyrea* Schiff., *Ammogrotis lucernea* L., *Diarsia festiva* Schiff., *Noctua (Triphaena) pronuba* L., *Cerapteryx graminis* L., *Eumichtis adusta* Esp., *Apamea monoglypha* Hufn., *Procus fasciuncula* Haw., *Homoeosoma saxicola* Vaugh., *Crambus culmellus* L., *Rhodaria cespitalis* Schiff., *Eudoria angustea* Steph., *Scoparia ambigualis* Treits., *Philedone gerningana* Schiff., *Eana osseana* Scop., *E. colquhounana* Doubl., *Epinotia mercuriana* Fröl., *Bactra lanceolana* Hübn., *Lobesia littoralis* Westw., *Olethreutes lacunana* Schiff., *Mniophaga terrella* Hübn., *Phthorimaea leucomelanella* Zell., *Borkhausenia pseudospretella* Staint., *Depressaria ciliella* Staint., *Cataplectica fulviguttella* Zell., s.sp. nov. ?—a race with two yellow sub-costal spots and a yellow basal streak on the forewings, *Plutella annulatella* Curt., *P. dalella* Staint., *Monopis rusticella* Hübn., s.sp. nov. ?—a race with the head dark brown, taken in hollows in a cliff face, *Hepialus fusconebulosa* Deg. (2) Scottish Lepidoptera collected during 1959: *Craniophora ligustri* Schiff., a female ab. *olivacea* Dobrée (in Tutt 1891, *The British Noctuae and Their Varieties*, 1: 13),

Port Appin, Argyll., 22nd June; *Tholomiges turfosalis* Wocke, six specimens, Port Appin, 22nd June; *Zygaena purpuralis* Brün., series from basalt, Kilninian, Mull, 30th June, and from limestone, Lismore, Argyll., 21st June; *Z. loti* Schiff. (*achilleae* Esp.), three specimens, Argyll., 28th June; *Aegeria scoliaeformis* Borkh., a female bred from pupa collected at Camghouran, Perth., 31st May; *Zelleria saxifragae* Staint., three specimens, Braemar, Aber., 2nd August, smoked from *Saxifraga aizoides* L.

Mr. J. H. C. PHILLIPS—Larvae and imagines of *Apatura iris* L. (Lep.) to show abnormalities in development. Two fully grown larvae bred from ova found in Northamptonshire between 8 and 25.vii.59, demonstrating failure of diapause. Both larvae in their last instar and the larger rapidly approaching pupation. One underside female imago which behaved in the same way during the early stages and emerged 29.xi.55 after a larval stage lasting 96 days, normal ecdysis occurring four times and the larva moulting five times. A normal sized female, emerged 27.vii.54, also after five moults. A dwarf male, emerged 20.vii.54, had been reared under satisfactory conditions and the extreme dwarfism did not appear to be environmental.

Mr. N. B. POTTER—A series of *Lysandra coridon* Poda, aberrations including: male upperside abs. *sessilis* Tutt, *metallica* B. & L., *laticornis* B. & L., *fowleri* South; male underside abs. *discreta* Tutt, *postcaeca* B. & L., *glomerata* Tutt + *fowleri* South, *lunacuspis* B. & L., *albescens* Cockerell, *tri-nigrum* B. & L., *costajuncta* Tutt; female upperside abs. *radio* B. & L., *antisinispertintransformis* B. & L., *auronulla* B. & L.; female underside abs. *antidiscreta* B. & L., *confluentiae* Courv., *nubila* B. & L., *pulla* B. & L., *crassipuncta* Courv., *virgularia* B. & L. Also aberrations of *Polyommatus icarus* Rott., underside abs. *confluens* Tutt, *arcuata* Weym., and an example showing characteristics similar to the *alboradia* B. & L., aberration of *Lysandra coridon* Poda.

Mr. AUSTIN RICHARDSON—Lepidoptera taken on the Isle of Arran, Bute, 5-12.viii.59: *Dysstroma truncata* Hufn. s.sp. *concinata* Steph., a long varied series, taken in several widely separated localities all of 500 ft. and upwards; *D. citrata* L. ab. *pythonissata* Mill., a long series of this parallel variety, taken some years ago in Unst, Shetland Is., for comparison; *D. truncata* Hufn., a short series of the double brooded lowland race, with a melanic specimen from Ayrshire, and a varied series from the Scilly Isles for comparison; *D. citrata* L., a short series; *Hydriomena furcata* Thunb., a long series of the brilliantly red and black coloured bilberry form; two *Oporinia filigrammaria* H.-S.; two *Ecliptopera silaceata* Schiff., one showing a pale median band; a *Lygris prunata* L.; *L. populata* L. ab. *musauaria* Frey.; an aberrant specimen of *Epirrhoë alternata* Müll., having part of the right central band missing; five *Colostygia didymata* L., two having yellow central areas to forewings; three small dark *Eupithecia tripunctaria* H.-S.; three *Crocallis elingvaria* L., all with dark central bands, and one ab. *signatipennis* Newst. & Smith; an *Alcis jubata* Thunb.; a bright series of *Euxoa tritici*

L., showing variation; six *E. obelisca* Schiff.; five *Amathes castanea* Esp., all the grey form, some with a slight pink suffusion; three *Agrotis restigialis* Hufn., strongly marked; a bright *Actebia praecox* L.; two *Cerapteryx graminis* L., one having forewings of different colours (Pl. II, fig. 8); a dark *Amathes agathina* Dup.; five *Noctua* (*Triphaena*) *comes* Hübn., together with three ab. *rufa* Tutt, an ab. *sagittifer* Cockayne, and one dark specimen approaching ab. *curtisii* Newm.; two *Apamea assimilis* Doubl.; two *Bombycia viminalis* F. ab. *intermedia* Tutt.; two *Aporophyla lutulenta* Schiff. ab. *luneburgensis* Freyer with an ab. *sedii* Guen.; a *Celaena leucostigma* Hübn., small and very bright; an *Apamea ophiogramma* Esp.; a *Hadena conspersa* Schiff., dark; varied series of *Hydraecia* spp., as yet undetermined; four *Plusia bractea* Schiff. (2) Lepidoptera taken or bred, 1958-9: Two *Acherontia atropos* L., Scilly Isles and Glos.; two *Laotaoë populi* ab. *fuchsi* Bartel, Glos. and Oxon.; a *Utetheisa pulchella* L., taken flying by day, Scilly Isles, 1958; a *Spilosoma lubricipeda* L., ab. showing joined spots, bred Scilly Isles; two *S. lutea* Hufn., one heavily marked, Staffs., one very lightly marked female, approaching ab. *denudata* Homb., Glos.; four *Harpyia* (*Cerura*) *bicuspis* Borkh., Staffs.; three *Lophopteryx capucina* L., one dark, Staffs., one dark and one banded, Glos.; two *L. cucullina* Schiff., Bucks.; one *Euproctis similis* Fuess., a second brood specimen, bred from a wild larva, Scilly Isles; a series of *Apatete alni* L., including six ab. *steinerti* Casp., bred, Yorks., from eggs supplied by Mr. W. Reid, four typical specimens from Devon, and five from Glos., of which four were dark with the thorax suffused; one *A. leporina* L. ab. *melanocephala* Mansbr., Staffs.; three *Dasychira pudibunda* L., with very dark forewings, Glos.; *Cryphia muralis* Forst., a pale aberration with pronounced black post-median line, Glos.; a *C. perla* Schiff., ab. *lutescens* Fuchs, Glos.; a series of *Amathes xanthographa* Schiff., bright with prominent stigmata and many with dark subterminal bands, Scilly Isles; two *Noctua* (*Triphaena*) *comes* Hübn., one being ab. *sagittifer* Cockayne with suffused hindwings, Scilly Isles, and the other ab. *sagittifer* + *rufa* Tutt, Scilly Isles; a series of *Hadena bombycina* Hufn., mostly from Salop, with two dark examples from Yorks., and two intermediate from Staffs.; two *Thalpophila matura* Hufn., one very light and one very dark, Glos.; a *Luperina testacea* Schiff. (Pl. III, fig. 7), almost obsolete, Scilly Isles; six *Procus versicolor* Borkh., Bucks.; one *Leucania loreyi* Dup., Scilly Isles, 1958; a series of *Anepia irregularis* Hufn., bred, Suffolk; one *Plusia ni* Hübn., Scilly Isles; two *P. gamma* L., with aberrant "Y" markings, Scilly Isles; one *P. bractea* Schiff., Glos., second county record; three *Lithomoia solidaginis* Hübn., Salop; a series of *Agrochola lychnidis* Schiff., including abs. *nigrobasalis* Cockayne and *fumosa* Cockayne and some banded forms, Glos.; eight *Eustroma reticulata* Schiff., Westmorland; thirteen *Hydriomena furcata* Thunb., five of the large sawfly form, three ab. *infusata* Staud. Westmorland, and five of the small bilberry form, greenish, Salop; one *Aspitates ochrearia* Rössler, new record from Scilly Isles; one *Coenoteaphria berberata* Schiff., Devon, new county record; one *Gonodontis bidentata* Clerck, ab. *nigra* Prout, Staffs.; two *Colotois pennaria* L. ab. *cuneata* Rudolph,

Glos.; seven *Palpita unionalis* Hübn., one Glos., 8.x.58, new county record, one Scilly Isles, 10.ix.59, and five, Mon., 8.x.59; one *Argynnis selene* Schiff., a heavily marked ab., Worcs.; one *Lysandra coridon* Poda. ab. *syngrapha* Kef., Glos.

Mr. A. ROBERTSON—One example of *Lycaena phlaeas* L., Watford, Herts.

ROTHAMSTED EXPERIMENTAL STATION—Earthworms in farm and garden showing notes on the life history of British earthworms, and specimens of the eight common garden species, i.e.: worms found near to the surface, *Allolobophora chlorotica* (Sav.) and *A. caliginosa* (Sav.); at intermediate depths, *Octolasion cyaneum* (Sav.); deep-living species, usually a foot or more below the surface, *Allolobophora longa* (Ude), *A. nocturna* (Evans) and *Lumbricus terrestris* L.; common in well-rotted manure or compost, *Eisenia foetida* (Sav.) and *Dendrobaena subrubicunda* (Eisen). The numbers and weights of worms are greatest in old grassland, where populations of five million worms per acre may weigh about a ton. After a year's cultivation the population may have fallen to 500,000 and weigh only two hundredweights. Chemical fertilisers do not kill earthworms, but probably encourage them, by providing more foodstuffs. A difference is found in the amount of soil turned over each year by worms casting on the surface of grassland and arable land. Only two of the 29 species produce surface casts in quantity; these are *Allolobophora longa* (Ude) and *A. nocturna* (Evans). *Lumbricus terrestris* L. commonly buries leaves and makes "cairns" of small stones above the entrance to its burrow. If the temperature does not become too hot in manure and compost several species are commonly found. The two main species here are *Eisenia foetida* (Sav.) (the Brandling) and *Dendrobaena subrubicunda* (Eisen.); and they may occur in great numbers. These worms may help to break down organic matter and make it more readily available to plants, but there is as yet little evidence to prove this. When these worms are spread on arable land in compost they usually die within a short period. Soil structure and fertility are usually improved when arable land is put down to grass. Part of this improvement may be due to earthworms. In gardens earthworms probably do most good on the lawn—the one place where they are least welcome. In cultivated soil worms are present in such comparatively small numbers that it is difficult to see how they can be very important. The ordinary processes of cultivation will turn over far more soil than the largest number of earthworms. It seems likely that a high earthworm population is often a sign that soil conditions are good, rather than that they are the cause of this condition.

Mr. A. D. A. RUSSWURM—Aberrations of Lepidoptera: *Lysandra coridon* Poda, two males ab. *fowleri* South, Dorset, August 1959; *L. bellargus* Rott., one male underside similar to the ab. *alba* B. & L. + *sagittata* Courv. in *L. coridon* Poda, and a series of two males and six females ab. *caeca* Courv. together with an aberration similar to

the ab. *postcaeca* B. & L. in *L. coridon* Poda, Hod Hill, Dorset, September 1959; *Plebejus argus* L., two female underside forms, one of which has both hindwings striated and the other with dark brown lunules on all wings, New Forest, Hants, July 1959; *Lycaena phlaeas* L., one female ab. *pallidula* Leeds, a male and female ab. *antipallidula* Leeds, and one female with hindwings ab. *radiata* Tutt, from Hod Hill, September 1959; further aberrations of the same species, one female ab. *obliterata* Scudder, a female with black spots on forewings enlarged to form a black irregular band, a female underside with markings on forewings greatly enlarged, New Forest, September 1959; *Pararge aegeria* L., a female with cream markings greatly reduced and absent from hindwings, New Forest, July 1959; *Maniola tithonus* L., a series showing range of variation from the New Forest, during July and August 1959, a female with ground colour reduced to pale straw, two males dark and suffused, with brown borders enlarged on all wings submerging the apical spot on the forewings, a male with dark brown areas bleached to greyish-white, three male undersides comprising one with buff markings absent from the hindwings, a typical example and one intermediate between the two; *Aglais urticae* L., a male and female with greyish-tan ground colour and three with black markings enlarged and distorted, Hod Hill, August 1959.

Dr. E. SCOTT—(1) Short series of three species of Arctic butterflies taken at Kilpisjärvi in Finnish Lapland (alt. 1,500-3,000 ft.) between 23rd June and 5th July, also specimens of four tortricid moths. A late season and cold weather delayed emergences and Lepidoptera were very scarce. Curiously *Plutella maculipennis* Curt. was seen on several occasions. The flora exceeded expectations. (2) Some species of plume moths from the Ashford district of Kent; *Agdistis bennetii* Curt., taken at light in Folkestone Warren and has not previously been noted from this area; the larvae probably feed on *Limonium binervosum* (G.E.Sm.) C. E. Salmon (Rock Sea Lavender) which grows on the lower part of the cliffs from Folkestone to Dover; *Trichoptilus paludum* Zell., found swarming in the central bog at Hothfield, Kent, on 26th June, where *Drosera rotundifolia* L. (Round-leaved Sundew), the food-plant of the larva is exceedingly abundant, at the same time (late afternoon) and place the adelid *Nemotois minimella* Zell. was taken on the wing.

Mr. K. W. SELF—Five groups of *Lysandra coridon* Poda as follows: GROUPS A and B comprising a series of males which include the following aberrational forms: *pallidula* Tutt, *cinnameus* B. & L., *pulla* B. & L., *livida* Gillm., *transformis* B. & L., *atrescens* Tutt., *grisea* Tutt, *neutra* B. & L., *ultramelaina* B. & L., *ultraviridescens* B. & L., *ultracaeruleo* B. & L., and *ultralavendula* B. & L., with typical examples. GROUP C comprising a series of females including the following aberrational forms: *atrescens* Tutt, *syngrapha* Kefer., *cinnameus* B. & L., *metallica* B. & L., *glabrata* Tutt, *pallidula* Tutt, *transformis*, B. & L., *flavescens* Tutt, *rufescens* Tutt, and *furvescens* B. & L. GROUP D comprising

underside forms of the aberrations *pulla* B. & L., *alba* B. & L., *grisea* Tutt, *ultranubila* B. & L., *fuscescens* Tutt, and *transformis* B. & L. GROUP E comprising a series of female underside aberrations including *fulvescens* Tutt, *partimtransformis* B. & L., *grisea* Tutt, *irregularis* B. & L., *pulla* B. & L., *nigrescens* B. & L., *ultranubila* B. & L., *postalba* B. & L., and *albescens* Cockerell. This exhibit was designed to illustrate the extent of ground colour variation to which this species is liable. Some have been exhibited previously in another context and with four exceptions all were taken in the summers of 1949 to 1958, inclusive, in Dorset, Hants and Kent.

Mr. D. W. THORPE-YOUNG—Local Lepidoptera from Carshalton, Surrey: *Cucullia absinthii* L., *Plusia iota* L., *P. pulchrina* Haw., and *Biston betularia* L.

Mr. R. W. J. UFFEN—A panel of photographs illustrating the life cycle of *Gracillaria syringella* F.

Mr. F. T. VALLINS—See Mr. T. R. EAGLES.

Professor G. C. VARLEY—A working model of a fly's thorax illustrating the way the indirect flight muscles of a fly produce the twisting and to and fro movements of a fly's wing. The model is based on a diagram in "Insect Flight" by J. W. S. Pringle, Cambridge University Press, 1957.

Mr. S. WAKELY—Lepidoptera bred or caught during the current year including: *Nola albula* Schiff., *Cryphia muralis* Forst., *Nonagria sparganii* Esp., *Tholomiges turfosalis* Wocke, *Platytes alpinellus* Hübn., *Alucita spilodactyla* Curt., *Epithectis mouffetella* Schiff., *Gelechia velocella* Dup., *Anarsia spartiella* Schr., *Opostega salaciella* Treits., *Leucoptera walesella* Staint. and *Monopis imella* Hübn., all taken in the Isle of Wight; *Euphyia luctuata* Schiff., bred from ova, Ham Street, Kent; *Evergestis extimalis* Scop., Higham, Kent; *Pandemis cinnamomeana* Treits., Box Hill, Surrey; *Adoxophyes orana* F.R., High Halstow, Kent; *Ancylis apicella* Schiff. (*siculana* Hübn.), Ashdown Forest, Sussex; *Pammene aurantiana* Staud., a series of five taken at Mickleham, Surrey; *Paltodora cytisella* Curt., Ashtead, Surrey; *Walshia rhamniella* Zell. and *Mompha miscella* Schiff., bred, Riddlesdown, Surrey; *Hypercallia christierna* L., bred, Wrotham, Kent; *Hyponomeuta irrorella* Hübn., bred, N.W. Kent; *Ethmia decemguttella* Hübn., bred, Druids Grove, Surrey; *Ethmia funerella* F., bred, Chartham, Kent; *Ornix finitimella* Zell., bred, Chipstead, Surrey; and *Gracillaria populetorum* Zell., bred, Ockham, Surrey.

Mr. D. H. WALKER—A series of five male *Lycaena phlaeas* L., captured in Sussex and Surrey during September 1959, including one with extraordinarily long tails to the hindwings (Pl. II, fig. 7) resembling those found on *Thecla betulae* L.; two abs. *obsoleta* Tutt; an aberration set as an underside, with four pear-shaped spots; and another aberration also set as an underside similar to that illustrated in South (*Butterflies of the British Isles*, Pl. 101, fig. 9).

Mr. J. L. P. WALLIS—A number of specimens illustrating mimicry amongst Hong Kong Rhopalocera, all taken between 1951 and 1953.

(1) The following Danaidae which are all very similar in appearance: *Danaus sita* Kollar; *D. aglea* Stoll. s.sp. *melanoides* Moore, taken 11.iv.52 and 8.vi.52; *D. similis* L. taken 7.vi.52; *D. limniace* Cramer, a male caught 27.iv.52; and *D. hamata* Macleay s.sp. *septrionis* Butler. These five species as a group are mimicked by the following two species: *Chilasa clytia* L. s.sp. *dissimilis* L. (Papilionidae) and *Hestina assimilis* L. (Nymphalidae) taken 8.vii.52 and 14.x.52. (2) Various cases of mimicry: *Argyreus hyperbius* L. female which mimics *Danaus plexippus* L. or perhaps *D. chrysippus* L. both of which were also shown; also exhibited as a mimic of *D. chrysippus* L. was *Hypolimnys misippus* L. female. (3) Another group of Danaidae similar in appearance and mimicking each other, namely *Euploea core* Cramer s.sp. *amymone* Godart (including a female taken 2.vi.52 which is an aberration with extra brown markings on all wings), *E. midamus* L., a male and two females taken 9.vii.52, and *E. mulciber* Cramer, a female. As a group, these three species are mimicked by the following three: *Hypolimnys misippus* L., males taken 4.ix.52, and *H. bolina* L. s.sp. *kezia* Butler taken 18.x.52 and 23.v.53 (Nymphalidae); also *Chilasa clytia* L. taken 13.v.52 (Papilionidae). (3) A male and female *Troides helena* L. s.sp. *spilotia* Rothschild. This species was first recorded from Hong Kong by the exhibitor, 3.iv.52. The same year larvae were obtained feeding on *Aristolochia tagala* Chan & Schl. The female shown was taken in a half dead condition clinging to a bush and when the butterfly was being set the abdomen was found to be in an advanced state of decay. Many of the species of the Danaidae obtain protection by feeding on the poisonous aristolochid plants, the juices of which remain active in the bodies of the butterflies and make them unpalatable to birds. It is believed by the exhibitor that *T. helena* also obtains protection in the same way and the bright yellow on the hindwings acts as a warning colour. In another papilionid from Hong Kong, *Athrophaneura aristolochiae* F. s.sp. *goniopetis* Rothschild the larva also feeds on *Aristolochia tagala* and the butterfly is said to be mimicked by *Papilio polytes* L., which also occurs in Hong Kong. (4) A *Lycaena phlaeas* L. aberration with the right upper forewing partially silvery-white and with the underside similarly affected, taken 29.vii.58 at Camaoril, Italy.

Mr. NORMAN A. WATKINS—Rhopalocera, mostly taken during 1959; *Colias croceus* Fourc., West Cornwall, September 1959; a male with excess of yellow scaling to the tips of black borders of forewings; a male with edges of forewing borders brown instead of black; a male underside with lanceolate discoidal spots to hindwings; and another with spots lanceolate in both directions; a female ab. *helice* Hübn. showing "pallida" characteristics, another female ab. *helice* Hübn. showing "partimtransformis" characteristics—this has a streak of bleached scaling across the right forewing including the outer margin; a small female, pale yellow, with suffused black margins; a female underside with well-developed wedge-shaped black markings to the forewing margins; two female undersides showing a tendency towards the "obsoleta" form. *Maniola jurtina* L., a male with greatly reduced

apical spots to the left forewing; a female ab. *commaculo* Leeds; a male with both apical spots absent, and a female with the apical spot absent from the right forewing—the last two from Wilts, 1959 (G. H. W. Cruttwell); and a male pale grey form. *Agapetes galathea* L., Somerset, June 1959, six males and a female approaching ab. *valentini* Williams; one male ab. *valentini* and an extreme female of the same aberration; a female ab. *valentini* bred from a wild female taken in 1958 *in cop* with an extreme ab. *valentini* male, the female laid 12 eggs only, of which only one larva survived the winter and that emerged in mid-July 1959 (a late date), it is a definite ab. *valentini* without being extreme; a male underside with marginal hindwing spots greatly reduced, and forewing apical spots absent; a male underside pathological aberration with reduced black scaling to right hindwing (Pl. III, fig. 8); another pathological male underside with large black radiations to the left hindwing, the upperside of this wing being wholly black with the exception of the white marginal wedges. *Coenonympha pamphilus* L., three males with an excess of black scaling to the margins of the hindwings, Sussex, 1959 (N. B. Potter); male with enlarged apical spots, Wilts., 1959 (N. B. Potter); a female with large bleached patches to forewing margins, West Cornwall, 1959; a male underside with duplicated apical spots to forewings; a straw-coloured female, Wilts, 1959 (G. H. W. Cruttwell); a similar female with grey marginal markings, Hants, 1957 (N. B. Potter). *Lycaena phlaeas* L., a series taken on a small moor in West Cornwall, September 1959, the males include abs. *schmidtii* Gerh., *intermedia* Tutt, *parvipuncta* Strand, *suffusa* Tutt including one very dark example, *kochi* Strand, and forms with parts of wings white instead of copper. *Lysandra coridon* Poda, from Wilts. and Sussex, 1959; male aberrations *inframarginata* B. & L. of different forms, *marginata* Tutt, *ultrapunctata* B. & L., *fowleri* South + *margino* B. & L.; male underside aberrations *albescens* Cockerell and *postradiata* B. & L.; female underside aberrations *caeca* Courv., *nigrescens* B. & L., *discoelongata* Courv. and a pathological form. The following were shown on behalf of Mr. G. H. W. CRUTT-
WELL: *Lysandra coridon* Poda female upperside ab. *fowleri* South, a small asymmetrical female underside which is *ultradiscreta* B. & L. + *arcuata* Courv. + *limbojuneta* Courv. + *metallica* B. & L., both specimens being taken in Wilts., 1959; two examples of *Lycaena phlaeas* L., from Somerset, October 1955; a female with pale ground colour, reduced forewing spots and a patch of white scales to lower edge of right forewing; a female with reduced forewing spots and a broad basal copper band to hindwings rayed inwardly with copper.

Mrs. N. I. WATSON—*Lycaena phlaeas* L., a series graded to show the range of variation including one female with hindwings ab. *radiata* Tutt, and five other specimens approaching this form; one male with basal half of forewing and a band on both hindwings ab. *pallidula* B. & L.; two males approaching ab. *obliterata* Scudder; eight specimens ab. *caeruleopunctata* Staud.; all from Hod Hill, Dorset, September 1959.

Lysandra coridon Poda, a series of aberrations including male upper-side abs. *fowleri* South, *partimtransformis* B. & L., *laticornis* B. & L., *lavendula* B. & L., etc., and one with right forewing greenish; male and female undersides including abs. *obsoleta* Tutt, *grisea* Tutt, several *I-nigrum* Tutt, *basijuncta* Tutt, etc., also an asymmetrical example with right hand wings of different colour; a female *?cinnameus* B. & L.; and one approaching *virgatus* B. & L.; Dorset, August 1959. *Lysandra bellargus* Rott., one female approaching ab. *ceronus* Esp., male and female ab. *caeca* B. & L., male ab. *obsoleta* Tutt, male underside with conspicuous blue patches at base of hindwings, Hod Hill, September 1959. *Polyommatus icarus* Rott., selected upper and undersides including abs. *obsoleta* Clark, *costajuncta* Tutt, *parvipuncta* Courv., *arcuata* Weym., and an aberration showing the characteristics of ab. *sagittata* Courv. of *L. coridon* Poda, Dorset, August and September 1959. *Plebejus argus* L., male and female underside aberrations, including one male with elongated spots, a female with pale yellow lunules, and another female with pale underside colour similar to the male, New Forest and Winchester, Hants, July 1959. *Maniola jurtina* L., one male with dwarfed right hindwing, two with enlarged rings on underside of hindwings, one dwarfed female, one albino, and various forms with whitish patches on all wings, Dorset, August and September 1959. *Aphantopus hyperantus* L., series including three large ab. *crassipuncta* Burkhardt, one with right hand wings dwarfed and ab. *caeca* Fuchs, left side normal, New Forest, July 1959. *Coenonympha pamphilus* L., an albino with a typical specimen for comparison, Hod Hill, September 1959. *Melitaea cinxia* L., series with black markings on underside of forewings similar to "I-nigrum" in some of the Blues (Pl. II, fig. 5); one of this series is a dwarfed male; also included is a female showing homoeosis with one hindwing coloured brown as upperside, bred, Isle of Wight. *Euphydryas aurinia* Rott., bred series including a number of very dark forms from Hod Hill. *Argynnis cydippe* L., one male with black markings on underside of forewings enlarged and distorted, Boldre, Hants, July 1959. *Pararge megera* L., a light female, a male with pale areas on the hindwings, and others well marked.

Mr. B. K. WEST—Lepidoptera, Pieridae: (1) A gynandromorph, right side mainly female, left side mainly male of *Teracolus ione* Godart d.s.f. *jalone* Butler taken at Wyliespoort in the Zoutpansberg, N. Transvaal, 9.vii.56. (2) Pieridae taken in Malaya from September 1957 to August 1959. From Tapah Hills Forest, Perak: *Leptosia nina* F., *Delias hyparete* L., *Prioneris thestylis* Doubl., *P. philonome* Boisd., *Huphina nadina* Luc., *H. judith* F., *Appias lycida* Cramer, *A. nero* F., *A. lalassis* Gr.-Smith, *A. melaina* F. f. *paulina* Cramer, *A. cardena* Hew., *A. indra* Moore, *Saletara liberia* Cramer, *Hebomoia glaucippe* L., *Pareronia valeria* Cramer, *Dercas verhuelli* van der Hoeven, *Catopsilia pomona* F., *Terias hecabe* L., *T. simulatrix* Semper, *T. andersoni* Moore, *T. lacteola* Distant, *T. lacteola* Distant f. *ada* Distant & Pryer, *T. sari*

Horsfld., *T. tiluha* Horsfld., *Gandaca harina* Horsfld. From Cameron Highlands, Pahang, alt. 5,000 ft. to 6,600 ft.: *Delias belladonna* F., *D. ninus* Wallace, *D. descombesi* Boisd., *D. baracasa* Semper, *Appias pandione* Hübn. and *Terias blanda* Boisd. From Kangar, Perlis: *Huphina nerissa* F., *Appias libythea* F., *A. albina* Boisd., *Ixias pyrene* L. f. *verna* H. Druce, *Catopsilia pyranthe* L. and *C. scylla* L. From Johore Bahru, Johore: *Eurema brigitta* Stoll. From Frasers Hill, Pahang: *Ixias pyrene* L. f. *alticola* Pendlebury. From Trolak Forest, Perak: *Phissura aegis* C. & R. Felder. From Hong Kong: *Pieris canidia* Sparr. (a species now established in Singapore).

Mr. A. J. WIGHTMAN—See Mr. G. HAGGETT.

Dr. C. G. M. DE WORMS—(1) A series of each of the following Lepidoptera taken or bred in the British Isles at the end of 1958 and during 1959: *Stauropus fagi* L., from Surrey, Sussex, Kent and Hants; *Odontosia carmelita* Esp., from Woking, Surrey and Aviemore, Inv.; *Notodonta ziczac* L., from Aviemore; *Drepana falcataria* L., pale form from Aviemore; *Eilema deplana* Esp., from the New Forest, Hants; *Sinyra albovenosa* Goeze, from East Suffolk; *Euxoa cursoria* Hufn., pale form from East Suffolk; *Hadena bombycina* Hufn., from Aviemore; *Amathes ditrapezium* Schiff., from East Suffolk; *Tholera cespitis* Schiff., from East Sussex; *Eumichtis adusta* Esp., from Aviemore, dark form; *E. lichenea* Hübn., from Tresco, Scilly Isles; *Dasypolia templi* Thunb., from Freshwater, I.o.W.; *Antitype xanthomista* Hübn., from South Cornwall; *A. flavicincta* Schiff., dark form from South Cornwall; *Gortyna (Hydraecia) petasitis* Doubl., from East Hants; *Nonagria dissoluta* Treits., light and dark forms from East Suffolk; *Calophasia lunula* Hufn., bred from Dungeness, Kent; *Cucullia asteris* Schiff., from East Suffolk; *C. absinthii* L., bred from Portland, Dorset; *Plusia festucae* L., from East Suffolk; *Xanthorhoë fluctuata* L., dark form from Aviemore; *Selenia tetralunaria* Hufn., from Aviemore; *Isturgia carbonaria* Clerck, from Aviemore. (2) Uncommon species and aberrations of British Lepidoptera taken at the end of 1958 and during 1959: *Pararge aegeria* L., a male with very yellow spotting, taken at Chiddingfold, Surrey, on 22nd April; *Tethea ocularis* L., a melanic example from the Woking area of Surrey; *Malacosoma neustria* L., a yellow form of the male with the cross-lines outlined in white and with the dark markings absent, Woking; *Spilosoma lubricipeda* L., a male with a black semi-circular line on the central portion of the forewings, from Woking; *S. lutea* Hufn., a heavily marked male with black line on forewings referable to ab. *fasciata* Tugwell, from Wood Walton Fen, Hunts., and another devoid of black markings on the wings from Woking; *Cryphia perla* Schiff., an example with orange-brown forewings from Woking; *Bombycia viminalis* F., a male with central band on forewings dark on a light background, from Ham Street, Kent; *Rhizedra lutosa* Hübn., a male with very suffused dark forewings, from Freshwater, I.o.W.; *Leucania unipuncta* Haw., a male from Tresco, Scilly Isles; *Eumichtis lichenea* Hübn., a very pale male from Freshwater; *Luperina testacea* Schiff., a very dark example from South Cornwall; *Orthosia gothica* L.,

an extreme ab. *gothicina* H.-S., from Aviemore; *Ectropis bistortata* Goeze, a melanic specimen from Woking; *Boarmia roboraria* Schiff., two very melanic examples taken in the Woking area; *Cleora rhomboidaria* Schiff., a small example of the green form from Tresco, Scilly Isles; *Apocheima hispidaria* F., a very melanic male from Virginia Water, Surrey; *Pyrausta perlucidalis* Hübn., a male example from Wood Walton Fen; *Nephopterix similella* Zinck., a specimen from the Woking area. (3) *Eupithecia phoeniceata* Rambur, an example of this pug new to the British List (Pl. III, fig. 2), taken near Penzance, Cornwall, 11.ix.59; it is a Mediterranean species appearing in those regions only in the autumn. The larva feeds on Cypress and Junipers in the winter months. (4) A selection of butterflies taken in Switzerland at Gletsch, Saas Fee, Riffelberg and Kandersteg in late July.

12th NOVEMBER 1959.

The PRESIDENT in the Chair.

Mr. Robert Wallis was declared elected a member.

EXHIBITS.

Mr. R. G. CHATELAIN—A reprint of an article by Dr. H. B. D. Kettlewell, "Brazilian insect adaptation".

Mr. DENNIS LESTON—Played tape recordings of the stridulations of several Hemiptera-Heteroptera and a coleopteron. He made observations on the recordings.

COMMUNICATIONS.

Mr. A. H. SPERRING commented on a report in a provincial newspaper concerning the fungus which attacks moths; the newspaper correspondent appeared to think that this fungus was scarcer than it used to be.

The PRESIDENT read a letter from Mr. B. M. GERRARD in which he said he wondered if any members had noticed any of the flies that are reputed to parasitize earthworms, actually in or ovipositing near to earthworms. In particular, *Pollenia rudis* (F.) (Calliphoridae), which is the very common cluster fly, has been bred from an earthworm, but he has never seen it in an earthworm. He also queried whether it will parasitize any other animal. Another fly concerned is the phorid *Diploneura pilosella* Schmitz.

The Annual exhibition was discussed and most members thought it a success, the exhibits were good in both number and quality in spite of a very dry season. Favourable comment was made on the photographic work exhibited, and the attendance book was reported to have been signed by 315 members and visitors.

26th NOVEMBER 1959.

The PRESIDENT in the Chair.

The following new members were declared elected: Miss S. L. K. Hocking, Miss M. I. K. Pengilly, Messrs. C. F. Lane, N. St. J. Cuming, D. J. Cross, D. K. Read, and H. M. Edmonds.

EXHIBITS.

Dr. C. G. M. DE WORMS—Larvae of *Nycterosia obstipata* F. (Lep., Geometridae) bred from stock obtained from Tresco, Scilly Isles.

Mr. A. E. GARDNER—The following species of Hymenoptera: (1) *Lampronota setosa* (Geoff.) (Ichneumonidae) a parasite of the Goat moth (*Cossus cossus* (L.)) taken by Mr. F. T. Vallins on the field meeting at Tilgate Forest, Sussex, 27.ix.59. (2) *Mutilla europaea* L. (Mutillidae) females taken by Mr. Vallins at Saas Fee, Switzerland, at 6,000 ft., 14.vii.59.

COMMUNICATIONS.

The LIBRARIAN reported that two more parts of the Royal Entomological Society's Handbooks for the Identification of British Insects had appeared and had been purchased. They deal with (a) Mecoptera, Megaloptera and Neuroptera, and (b) a further section of the Ichneumonidae. The issue of *Lloydia* for March 1959 is of special interest to us because it is devoted to a long account of the dispersion of small organisms including insects, the author is D. C. Wolfenbarger. Mr. S. N. A. Jacobs had presented Fascicle 3 of Tome I of Alexanor, the new French publication dealing with Lepidoptera. There had recently appeared a small book in English entitled "A Handbook of Mushrooms". It has 80 coloured plates depicting 94 species of mushrooms and toadstools, most of which are found in Britain. The book is by Pilát and Usák and was printed in Czechoslovakia.

Attention was drawn by Mr. F. D. Buck to *Cercyon laminatus* Sharp (Col., Hydrophilidae) a beetle new to the British list which Mr. A. A. Allen had shown at the Annual Exhibition. He said the beetle had occurred at mercury vapour light at Blackheath, S.E. London, and although described from Japan had, in recent years, been taken in Germany at Hamburg and Berlin, also at light. Lepidopterists working mercury vapour traps were asked to watch for this species.

The rearing of *Ptilophora plumigera* L. (Lep., Notodontidae) was commented on by Mr. J. O. T. HOWARD. Last year Mr. G. A. Cole had found a female on his front door at Dorking, Surrey, from which a fair number of eggs were obtained. Some of these were given to Mr. R. Fairclough, some to Mr. Howard, and the remainder were retained by Mr. Cole. The proportion of infertility was high, only 12 hatching from Mr. Howard's batch of 30 eggs, but the resulting larvae grew well. Mr. Fairclough kept his too warm, all emerged early and all were hopeless cripples; and probably for the same reason Mr. Cole's failed to pupate. Of Mr. Howard's batch nine good moths emerged and one hopeless cripple. He attempted to continue breeding but the female

died after pairing without laying. From these experiences Mr. Howard concluded that for successful rearing fairly cool conditions were necessary, and it was desirable to keep the larvae and pupae a little damp.

A series of coloured transparencies were shown by Mr. J. D. Bradley, Dr. C. G. M. de Worms and Mr. F. T. Vallins. Mr. M. W. F. Tweedie showed some entomological photographs on the epidiascope.

10th DECEMBER 1959.

The PRESIDENT in the Chair.

Mr. B. M. Swann was declared elected a member.

EXHIBITS.

Mr. AUSTIN RICHARDSON—An unset example of *Dysstroma truncata* Hufn. ab. *concinata* Steph. (Lep., Geometridae) from the Isle of Arran.

Mr. T. R. EAGLES—The fungus *Stereum purpureum* Pers., the cause of "silver leaf" on plum trees and of damage to beech timber.

COMMUNICATIONS.

The SECRETARY read a letter from Mr. A. J. Wightman in which he called attention to the record of *Nonagria algae* Esp. (Lep., Noctuidae) published in the report of the field meeting held at Buckland sand pits and Reigate Heath, 28.iv.57 (1958, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1957: 64). He said the larvae of this species would be very small indeed and most difficult to find at this time of the year; it is also an extremely unlikely locality for this insect.

A paper was read by Mr. Austin Richardson on "The Lepidoptera of Gloucestershire" which was followed by many questions.

14th JANUARY 1960.

The PRESIDENT in the Chair.

A welcome was extended to Dr. Varie of the Transvaal Museum, Pretoria.

EXHIBITS.

Mr. F. D. BUCK—A fossil, probably a carboniferous tree fern leaf, from a colliery near Whiston, Lancs.

Dr. C. G. M. DE WORMS—A living female *Nycterosia obstipata* F. (Lep., Geometridae) which had emerged from pupa that day.

Mr. S. WAKELY—Five specimens of *Pammene aurantiana* Staud. (Lep., Tortricidae) taken at Mickleham, Surrey, at the end of July, together with another which he had bred from sycamore seeds gathered in September at the spot where the other five were captured. This moth emerged out of season on the 19th December and is the first record of a specimen having been bred in captivity; in fact, the actual

foodplant previously having been unknown. Two specimens of *Pammene regiana* Zell. were also shown for comparison, the larvae of both species being very similar in appearance as well as feeding in the same manner on sycamore seeds and at the same date.

COMMUNICATIONS.

Mr. C. N. HAWKINS said that on the 30th December he had seen an example of *Phlogophora meticulosa* L. (Lep., Noctuidae) on a fence at East Molesey, Surrey. Another example was reported by Dr. C. G. M. DE WORMS to have occurred in his light trap at Woking, Surrey, three days later. The weather during the period covered by these reports had been mild.

Series of coloured slides were shown by The PRESIDENT, Dr. C. G. M. DE WORMS, MESSRS. L. CHRISTIE (on behalf of Mr. J. E. KNIGHT), R. F. HAYNES and R. W. J. UFFEN.

28th JANUARY 1960.

88th ANNUAL MEETING.

(With which was combined the Ordinary Meeting.)

The President, Mr. F. T. VALLINS, A.C.I.I., F.R.E.S., in the Chair.

Owing to the illness of Mr. J. L. HENDERSON, the Hon. Treasurer, his Report and Accounts were presented by Mr. T. R. EAGLES, who moved their adoption. They were seconded by Dr. B. J. MACNULTY and carried.

The Council's Report was read by the HON. SECRETARY, who moved its adoption. Mr. M. W. F. TWEEDIE seconded and the Report was carried.

The PRESIDENT then declared the following Officers and Ordinary Members of Council elected for 1960:—*President*: R. M. Mere, V.R.D., M.A., F.R.E.S. *Vice-Presidents*: F. T. Vallins, A.C.I.I., F.R.E.S., and A. M. Masee, O.B.E., D.Sc., F.R.E.S. *Treasurer*: J. L. Henderson. *Secretary*: B. Goater, B.Sc., F.R.E.S. *Editor*: F. D. Buck, A.I.Ptg.M., F.R.E.S. *Curator*: M. G. Morris F.R.E.S. *Librarian*: T. R. Eagles. *Lanternist*: L. Christie. *Ordinary Members of Council*: G. J. Ashby, F.R.E.S., H. G. Denvil, F.R.E.S., F.R.H.S., A. E. Gardner, F.R.E.S., N. E. Hickin, B.Sc., Ph.D., F.R.E.S., J. O. T. Howard, M.A., G. H. Mansell, J. L. Messenger, B.A., N. D. Riley, C.B.E., F.Z.S., F.R.E.S., W. H. T. Tams, F.R.E.S., and M. W. F. Tweedie, M.A., F.Z.S.

EXHIBITS.

Mr. T. R. EAGLES—Twigs of *Salix aurita* L., *S. lanata* L., *S. atrocinerea* Brot. and of various introduced species. He drew attention to the differences in the catkin scales.

Mr. A. E. GARDNER—Specimens of *Necrodes littoralis* (L.) and *Necrophorus investigator* Zett. (Col., Necrophoridae) taken in a mercury vapour light trap at Aviemore, Inv., by Mr. F. T. VALLINS during August 1959. Mr. Gardner said that specimens were present every night and that on one occasion about 70 *N. investigator* were found in the trap in the morning.

Mr. S. N. A. JACOBS—Co-types of *Crambus bolivarellus* Schmidt (Lep., Crambidae) from the Madrid district of Spain, and *C. telekiellus* Schmidt from Tunisia.

Mr. R. W. J. UFFEN—A male and a female of the sawfly *Tenthredo omissa* (Foerst.) (Tenthredinidae) from a colony beside the Thames at Chiswick, Middx. This is the only known British locality outside the fens of East Anglia. Mr. Uffen pointed out that the insect flies in August and that the foodplant is not yet known in Britain. The specimens were donated to the Society's collection.

Dr. C. G. M. DE WORMS—Two larvae of *Ceramica pisi* L. and one larva of *Anathes xanthographa* Schiff. (Lep., Noctuidae) sent to him by Dr. Houyez of Liege and preserved by a special process which he has developed.

COMMUNICATIONS.

The PRESIDENT announced that Messrs. F. J. COULSON and E. E. SYMS had been elected Honorary Members in recognition of their long and valued service.

Mr. R. M. MERE said that, for him, the season had opened, he having seen the following Lepidoptera:—*Erannis leucophaearia* Schiff. and *Theria rupicaprararia* Schiff. (Geometridae). Mr. J. L. MESSENGER reported having seen *Phigalia pilosaria* Schiff. (Lep., Geometridae).

THE PRESIDENT read his Address, and vacating the Chair, inducted the new President, Mr. R. M. MERE. Mr. Mere thanked the meeting for honouring him in this way and moved a vote of thanks to Mr. VALLINS, at the same time asking his permission to publish his address. In his reply, Mr. Vallins gave this permission.

A vote of thanks was moved by Mr. S. N. A. JACOBS to the Vice-Presidents, Officers and Council, which was seconded by Mr. C. N. HAWKINS and carried. Mr. T. R. EAGLES replied.

Mr. T. R. EAGLES moved a vote of thanks to the Auditors which was seconded by Mr. H. G. TUNSTALL and to which Mr. R. M. MERE replied.

THE PRESIDENT'S ADDRESS.

Read by F. T. VALLINS, A.C.I.I., F.R.E.S.

A year ago you paid me the very great honour of electing me your President. My period in office is about to terminate and it is not without a certain surprise that I look back to the day of my election and contemplate the feeling of doubt, almost amounting to anxiety, which

I experienced on that occasion. I had not allowed for your inherent kindness, and it is difficult for me to express adequately my gratitude to you all for your forbearance and understanding which has made my term of office such a pleasant experience. I am also greatly indebted to the Honorary Officers and Members of the Council who have been so helpful and ready to lighten what few burdens fell upon me. Happily, the past year has been free from any of those troublesome crises, which often absorb so much valuable time.

You have just heard from the reports which have been read to you that the position of the Society is eminently satisfactory, except for the slight drop in membership, which will almost certainly soon be rectified. I do not propose to enlarge upon the details put before you, for I am sure that nothing I can say will put the facts more clearly.

There is, however, one unfortunate event to which I would like to refer. You will probably realise that I speak of the regrettable decision of Mr. A. E. Gardner to retire from the office of Honorary Curator, which he has held with such distinction for the last five years. We have all marvelled at his exceptional capacity for work and, despite a number of other heavy commitments, he has carried out cheerfully and with meticulous care a succession of major tasks on the collections. It gives me very great pleasure to thank him most sincerely on your behalf for the outstanding service he has rendered to the Society.

I would also extend a hearty welcome to his successor. We are indeed fortunate that Mr. M. G. Morris, F.R.E.S., has offered his services and I have no doubt he will leave his indelible impression on the collections, as Mr. Gardner has done.

Death has dealt us a series of heavy blows during the past year, nine members, among whom were some of the most loyal friends of the Society, having died.

Dr. G. V. Bull joined the Society in 1927 and for many years was a regular attendant at our meetings. He was keenly interested in the British Lepidoptera, and frequently brought exhibits. During the last few years, his visits became less regular as his hearing became impaired and his health began to fail. He died in March and bequeathed his collection to the Society which incorporated the choicest insects into its collection, the remainder being distributed to members.

Mr. R. Eldon Ellison was a very staunch supporter of the Society in which he took a great interest, and his absence will be sadly felt. He joined in 1945 and for a long time rarely missed a meeting. He had a most comprehensive knowledge of the European and Middle Eastern Lepidoptera. In recent years, he concentrated more upon the Zygaenidae and British Lepidoptera generally. He was educated at Clifton College, Bristol, and New College, Oxford, and was, for a time, a master at Charterhouse. Later he went to Cambridge to study oriental languages and became a skilful linguist. He joined the Consular Service and held Consulates in the Lebanon, Morocco, Abyssinia, Arabia and Panama. He seized every opportunity to make extensive collections wherever he was sent. In the Lebanon, he discovered a beautiful new

lycaenid, which Pfeiffer named *Albulina ellisoni*. Although he had been ill for a long time, his death was a surprise, and a shock to us all. He was nearly 64 when he died on 3rd September.

Mr. R. A. Fraser, brother of the late G. de Courcy Fraser, died in July in Zululand, where he had been living for the past few years with relatives. He was a lepidopterist and joined the Society in 1952. He was only seen at the Annual Exhibitions.

Mr. F. T. Grant died on 27th August, a few days after his 89th birthday. He was a coleopterist of considerable experience, mainly working Kent and concentrating on the area around Gravesend. He took a very fatherly interest in young entomologists, a number of whom attribute their devotion to the study of 'other Orders' to his encouragement. He regularly attended our meetings at Hibernia Chambers. He joined the Society in 1924 and was made an Honorary Member in 1957.

Mr. D. A. Hawgood died suddenly at the end of January 1959. He was of a very quiet and retiring disposition but was a well known figure at our meetings, which he frequently attended. He was a lepidopterist and joined in 1927. He proved his great affection for the Society by generously bequeathing the sum of £100.

Mr. H. V. Line, who died in November, joined the Society in 1934. He does not appear to have attended many meetings, at least in recent years, and his particular interest in natural history is not known.

Mr. A. W. Richards studied many Orders of insects. He joined us in 1952 and usually only attended the Annual Exhibition, to which he brought his best insects, many of which he had bred. He died in August.

Mr. E. J. Summers died in February. He joined the Society in 1939 and, although he lived near London, he was seldom seen at meetings. He was interested in Coleoptera and Hemiptera.

Mr. H. D. Swain joined the Society in 1950 and his quiet demeanour soon endeared him to his fellow members. He took a most active interest in the Society. Whilst studying many Orders, especially Lepidoptera, Hymenoptera and Orthoptera, he was attracted to the problems related to mimicry and protective resemblance. He had a comprehensive collection, which included many valuable Catagrammas. He was Science Master at St. Paul's School, Hammersmith, where he was regarded with particular affection by the students. He was a consummate artist and drew the beautiful coloured plates for two of Warne's publications, *Land and Water Bugs of the British Isles*, by T. R. E. Southwood and Dennis Leston, and the new edition, not yet published, of Richard South's *The Moths of the British Isles*. Unfortunately, he did not live to see the publication of the results of his tremendous concentration and devotion to the task in hand, but these volumes will remain a fitting memorial to his industry and artistic skill. He died in August in tragic circumstances when starting for a holiday in Corsica, which he had planned for the purpose of collecting the island's specialised insects.

You have already stood in memory of these departed members when their deaths were announced and I will not ask you to do so again.

I now come to the second part of my address, to which I have given the title:

THE MECHANISM OF SPECIATION IN ANIMALS

Just eighteen months ago, the scientific world celebrated the centenary of the occasion when Charles Darwin and Alfred Russel Wallace first submitted to a somewhat sceptical and incredulous audience their revolutionary theories on evolution, and my thoughts have naturally turned to the enthralling problems that will for ever be associated with those illustrious naturalists. I have reflected also on the tragedy that although an account of Mendel's experiments was published in Darwin's lifetime, it was overlooked until after his death. In trying to deal with genetics, evolution and speciation, I have become acutely aware of the difficulty and complexity of the subjects, but I have been encouraged by the thought that all of you will know something about the matter and some of you will know a great deal.

The modern concept of the mechanism of evolution is based upon Mendel's theory of 'particulate inheritance' and consequently dates from the rediscovery of his work at the beginning of the present century. Since that time remarkable progress has been made in the science of genetics—the inevitable outcome of Mendel's work—and the study of inheritance has become much more precise with the realisation that most heritable characters are transmitted from parent to offspring through the medium of genes and chromosomes.

The process of speciation, which forms the main topic of my address to you to-night, is so intimately linked with the behaviour of genes that a slight knowledge of genetics is desirable, if not essential, if some of the more interesting aspects of the subject are to be fully understood. However, in the short time at my disposal, I can only touch very briefly upon such a vast subject.

Every body cell of a bisexual organism has two sets of homologous chromosomes, one set from each parent, the gene content of each being similar except for the chromosomes concerned with sex. During the process of meiosis the maternal and paternal chromosomes and genes separate and form the nuclei of a pair of new cells, but which cell of a pair the individual chromosomes enter is quite random and the assortment in the new cells is unpredictable. Some may be from one parent and some from the other.

The number of chromosomes in a cell varies with the species. For instance, Shull (1951) records that *Ascaris*, a nematode worm, has only two, whereas the geometrid moth *Phigalia* has as many as 224. Mathematically inclined students may like to calculate the vast number of possible combinations which could arise from the 112 pairs in the latter example.

The significance of this reassortment lies in the responsibility of the genes and chromosomes for moulding in the phenotype the accumulated

characters of the organism, morphological, physiological or behavioural, by which it is normally recognised, the probability of variation being closely related to the number of possible chromosome combinations.

An additional complication arises when a gene mutates. A mutant gene may have quite a different effect on the phenotypic characters which it controls, and, as a gene not only influences a number of characteristics in the phenotype but also modifies the action of other genes in the same chromosome, the result of mutation may be of an obscure nature. Moreover, all chromosomes are composed of many genes, some of enormous numbers—one estimate credits man with nearly 50,000—so that the system that builds up the organism is one of extreme intricacy. The presence of so many genes in such a microscopic body as a chromosome impresses one with their excessive minuteness, and the fact that such wonderful potentialities are stored in so tiny a structure—they can rarely be seen, except in such well known cases as in the larval salivary glands of species of the fruit flies, *Drosophila* (Diptera), and their existence is often only deducible from the recorded results of controlled experiments.

The various ways in which any gene may mutate introduces another complication. *Drosophila melanogaster* Meigen has a gene governing the colour of the eyes, and this has mutated in so many different ways that at least 15 eye colours have been produced. Many other phenotypic characters have changed similarly in various directions because different mutations have occurred to genes in the same loci. In all probability, all genes are capable of multiple mutations, a store for potential future variation. It will thus be seen that the possibilities of variation in an organism are enormous.

Initially, all carriers of mutations are heterozygous and, being mostly recessive, the presence of the mutations is not immediately apparent. They are kept in reserve until, by chance, the carrier of the mutant gene mates with a member of the opposite sex in which the homologous gene, the allelomorph, has mutated in the same way or the mutation has been acquired by inheritance. Following the mendelian rules, a proportion of the offspring from the pairing will be homozygous for the gene in that locus and its existence will be revealed in the phenotype. Genetic mutations, however, only occur very infrequently in any population, and the chance of a meeting between two carriers of the same mutation is extremely remote in the early stages, the degree of probability varying with the size of the population and the mobility of the individuals. Pairing between individuals not carrying identical genes tends towards sterility, if the degree of incompatibility is too great, and the elimination of the mutant. Even should the progeny be viable, the chances are that the gene, once expressed in the phenotype, will prove to be deleterious and will result in the destruction of the homozygous carrier and in its own elimination.

The cause of mutations in wild populations is not known with any certainty, except that it is of a chemical nature. Darlington (1958) states that the structure of a chromosome is a combination of protein and

nucleic acid, and gene mutations may be induced by treatment with acids which change their chemical content. An interesting summary of chemical experiments of this kind is given by Dobzhansky (1957, pp. 43-45). X-rays have also been used as a mutagenic agent, principally to create chromosome breakages. It is worth while meditating on the possibility that the ultimate cause of the development of our species and aberrations as we know them to-day may be the energy generated by colliding galaxies some 450 million light-years away.

Genetic mutations are not the only cause of phenotypic changes—chromosome breakages are often responsible, and considerably extend the range of possible variation. Chromosomes may get lost, resulting in an unbalanced hybrid of reduced viability, or they may multiply, producing a polyploid organism, extremely rare in animals and usually associated with gynandromorphism or parthenogenesis. Two homologous chromosomes may break in the same place and exchange the broken parts, the outward appearance being unchanged. This is known as 'crossing over'. Structural changes within a chromosome may also occur. Breaks may occur in two places between the genes and the broken parts join together again without causing any derangement, but occasionally the broken section will reunite in an inverted position. When this happens, the genes in the rejoined section will have reversed their order and the change is called an 'inversion'. The rearrangement of genes in this manner, when not lethal, as it may well be, is of considerable importance in evolution because the phenotypic expression of a gene is affected by the degree of its proximity to all other genes in the same chromosome. When a gamete carrying an inversion unites with another gamete with genes in the normal order the additional complications of pairing which arise in these circumstances are overcome by one chromosome making a loop, thereby bringing all the allelomorphs together. There seems to be no difficulty in this in the Diptera (J. M. Smith, 1958) provided that the cumulative effect of a number of inversions has not caused a too diverse assortment of the genes, but in many other animals the result is reduced fertility. Non-homologous chromosomes may sometimes exchange segments and this process is known as 'translocation'.

From the above short account of some of the ways in which the genotypic constitution of an organism can be changed by mutations of genes and the breakage of chromosomes, in addition to the normal process of particulate inheritance, it will be readily appreciated what an almost unlimited fund of potential variation awaits favourable circumstances for expression and development.

Whilst we are on the subject of inversions, I might mention that these have been extensively studied in the giant chromosomes of the larval salivary glands of the fruit flies, *Drosophila pseudoobscura* Frolowa and *D. persimilis* Dobzhansky & Epling. The pedigrees or probable lines of descent of the races in wild populations of both species have been worked out by Dobzhansky, providing an enlightening illustration of how varying populations can develop from a common genotype by a series of chromosomal inversions.

So far, when speaking of mutations, I have used the term in the correct but more restricted sense of mutations of genes, but any further reference to mutations should be understood to embrace the wider concept of chromosome breakages, as well as genetic mutations—or, expressed more briefly, any phenomena which lead to heritable phenotypic changes.

Before proceeding further, it is advisable for me to say a few words on the vexed question of what we understand by 'a species'. There have been many attempts to give a satisfactory definition and the diagnostic criteria emphasised differ in nearly every case, dependent upon the bias and line of approach of the writer, and the type of organism in mind. The taxonomist, being mainly—and rightly—concerned with improving his systematic arrangements and facilitating their utilisation by fellow students, prefers to concentrate on degrees of morphological distinctions, with the inevitable resultant problems, such as those associated with sibling species, usually only separable by a study of biological and genetic differences. By the nature of his work on dead specimens in museums, he is usually deprived of correlative biological data, which would have enabled him to examine the material available with the broader vision of a systematist and field naturalist combined.

The biological species concept is more in keeping with evolutionary problems, being solely concerned with the progress of living organisms, and is based on reproductive capability or incompetence, but, as we shall see later, this is by no means an infallible criterion. The presence of potential interbreeding in the wild is the paramount consideration.

Although biologists must use the systematists' morphological distinctions to describe easily recognisable differences between species, they do not regard these as fundamental, and indeed they may be the most difficult characteristics to define satisfactorily. The existence or absence of natural, spontaneous interbreeding is looked upon as a more acceptable criterion, despite its inherent difficulties when dead material is being studied.

Mayr (1942) provides a very brief but workable definition of a biological species, which is often cited by other authors. He states that "species are groups of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups". In other words, there must be intergroup fertility but extragroup sterility, and, although there are exceptions to this criterion, the definition seems to cover most contingencies.

Sheppard (1958), viewing the problem from the standpoint of a geneticist, whilst defining a biological species in similar terms, refers to the exchange of genes, thus emphasising the genetical basis of reproduction. He describes a species as "a population or group of populations which are capable of exchanging genes, one with another, in nature, if they come in contact".

There is no essential difference between these two definitions, and either provides a suitable workable base from which to proceed.

It is important to notice that both scientists rely on species behaviour in wild populations. Although some species will hybridize without

much difficulty under laboratory conditions, the fact that they live together in nature and do not crossbreed in normal circumstances is sufficient evidence of their reproductive isolation and specific distinction. Sterility between species must not be confused with the absence of interbreeding between natural populations. There are degrees of sterility between species, from complete sterility to almost complete fertility, the extent being mainly dependent upon the magnitude of incongruity between the genotypes. It is reasonable to assume that absolute sterility in a cross is indicative of specific difference, but, owing to the reluctance of many animals to mate in captivity and provide the desired evidence, the absence of natural interbreeding is a criterion of much more general utility.

Successful crossbreeding experiments have been conducted, and the results published, by Clarke & Sheppard (1953 and 1955) and Sheppard (1958), on certain species of *Papilio* from America, which, although flying at the same time and in the same localities, never hybridize in the wild. Nevertheless, in captivity they can be persuaded by manipulation to copulate and produce partially fertile hybrids, suggesting that the isolating mechanism is largely psychological incompatibility, and certainly not entirely genetical.

Let us now look at the influence that genetic constitution has on a population of a species. All members of an interbreeding population will have basically the same genetic make-up, for this similarity is the very essence of crossability and viability. A certain degree of variability, maintained by recurrent mutations, is always detectable, but in a stable population this is kept within certain limits by environmental selection eliminating any individuals with characteristics which are harmful in the prevailing conditions. This removal of disadvantageous elements encourages the spread of genes controlling beneficial phenotypic characters, because individuals carrying such genes would tend to thrive and produce progeny with the same physical advantages.

The size of a population may vary from a few individuals to an assemblage of many millions, dependent upon the species of animal and the size of the ecologically suitable habitat available. In a small population it is reasonable to assume that in most cases all individuals will be sufficiently close together to ensure continuous gene flow throughout the colony, but this would be modified by the mobility of the species under consideration. Very active and migratory butterflies, such as some species of *Colias*, would spread their genotype much more rapidly over a much wider area than would more gregarious and firmly domiciled species, such as *Strymonidia pruni* L., or *Plebejus argus* L. (Lep., Lycaenidae).

Whilst on the one hand, a population, occupying a somewhat restricted area of relatively uniform conditions, is sufficiently small to enable genes to spread rapidly throughout the colony, little difference will be noticed, genetically or phenotypically, between samples taken from opposite ends of the area. But on the other hand, if the colony is a large one, covering an area of varying ecological conditions, such as different degrees of temperature, humidity or altitude, a variety of

forms, governed by different genes or local conditions, will be developed, each in the areas favourable to its propagation. When the inhabited territory is extensive, with environmental gradients, such as increasing temperatures from north to south, there will be a tendency for the population to display a corresponding parallel gradation in some characters. Sometimes, the progress from one form to another may be so gradual that the change may be quite imperceptible, except by a comparison of specimens from localities far apart. On the other hand, characters may alter in a series of steps, making a number of abrupt changes towards an ultimate form which is quite different and easily distinguishable from types taken from other parts of the habitat. These character gradients, whether gradual or stepped, have been called *clines* by Huxley (1942). A typical cline is provided by the distribution of the different forms of the Large Heath butterfly, *Coenonympha tullia* Müller, which are fully discussed by E. B. Ford (1945), and the same author (1955) draws attention to a number of *clines* among the British *Heterocera*.

It is sometimes impossible to determine without breeding experiments whether this adaptation to changing environmental conditions is of genetic origin or a non-genetic reaction to the conditions. The latter changes are of little value in evolution, but when they are genetical the evolutionary trend may be quite significant, resulting in reduced fertility in crosses between individuals from opposite ends of the cline.

Purely phenotypic adaptations may play an indirect part by enabling an organism to survive in abnormal conditions, during which time genetically controlled characters, which had hitherto been useless, may for the first time have an advantage owing to their suitability in the new environment. Different mutations may also be favoured and spread when they occur, thus creating a population with a new genotype.

The problem of the tendency towards intersterility within a species is closely related to the phenomenon of 'Ring-species'. Where this situation exists, the distribution of the species may be likened to a length of chain arranged in a circle with the loose ends touching, every link representing a different subspecies which interbreeds freely with those with which it is in contact. The subspecies represented by the terminal links, being genetically remote owing to the cumulative effect of the intervening stages of subspeciation, do not crossbreed but behave as distinct species, even though they are sympatric in some places. If it were not for the linkage by the intermediate subspecies, their distinct specificity would not be questioned.

This interesting situation is admirably demonstrated by the distribution of a number of birds, every one of which would be split into two species on morphological characters and the absence of interbreeding, but for the linkage by graded forms, which prove very close specific relationship. Their true status is a matter for the judgment of the expert in such matters. This aspect of speciation is well covered by Mayr (1942), who gives several instances among birds in which the situation occurs in a most instructive and enlightening manner.

But there is a rapidly growing number of somewhat similar instances being recognised in the distribution of insects. W. T. M. Forbes (1928) points out that the butterfly, *Junonia lavinia* Cramer (Nymphalidae), reached the West Indies from both North and South America and now behaves as two quite distinct species where the two lines of migration meet in Cuba. Avinoff and Sweadmer (1951) record that two butterflies, *Karasana josephi* Staud. and *K. leechi* Gr.-Gr. (Satyridae), live together as two sympatric species in the Alai Valley, but when they reach northern Pamir they merge and behave as one species, pairing quite freely.

However, it should not be assumed that the differentiation of forms leading to the founding of new species always arises through the medium of clines or ring species as just described, although this method of development is probably much more frequent than we at present suspect. The much simpler process of the creation of geographical barriers which split populations into two or more smaller groups is the usual first step towards genotypic divergence, and the ways in which such barriers arise are numerous and varied.

It will be readily appreciated how effective a barrier water can be to certain terrestrial animals and land masses to aquatic creatures. Rivers, oceans, swamps, deserts, mountain ranges, valleys, forests, cultivated land—these are but a few of the more obvious instances which come to mind—are all indispensable to the well-being of some creatures but endanger the very existence of others which require a different biotope for survival. No great difficulty would be experienced in recalling many examples of animals which would find these barriers insuperable obstacles. On the other hand, the effectiveness of barriers is not so apparent when barriers of a minor nature are concerned, even though they may be just as efficient in operation. A geographical barrier need not be of a kind easily perceptible to us—it may be of a much more subtle nature. It need only be an area in which a creature cannot live, whether due to the absence of food, excessive humidity or dryness, or the existence of predators is immaterial, or an area over which it cannot or will not pass, to constitute a completely effective obstacle.

It is a curious fact that some birds will not fly across rivers, although quite capable of flying much longer distances, as in the case of certain species of birds near the River Amazon (Mayr 1942). Bracken and long grass may be a barrier to the extension of the range of the Common Blue butterfly, *Polyommatus icarus* Rott. or short grass to the movement of the Meadow Brown butterfly, *Maniola jurtina* L., as happens on Tean, in the Scilly Isles (Dowdeswell, 1952). At one time near Basle there was a locality, since destroyed by buildings, in which two different subspecies of the Silver-studded Blue butterfly, *Plebejus argus* L., flew. Although they were separated only by a strip of unsuitable terrain 100 yards wide, no movement from one occupied zone to the other was ever observed and each race continued to breed

true. Innumerable similar examples could be cited to demonstrate what unexpected obstacles can lead to complete isolation between populations.

In any population the distribution of particular genes is irregular and their frequency throughout the population varies from place to place. A genetical analysis of a sample taken from any part would differ from a similar sample from elsewhere. This being so, it will be seen that any section that is separated from a population and starts an independent existence will do so already in possession of a somewhat different genotype. Moreover, no two localities offer identical living conditions and every population would thus be exposed to different selective factors. Natural selection, working on the available characters, will tend to eliminate all harmful genes and preserve those of a beneficial nature, the relative values of which will differ in every population. This will inevitably lead to a progressive divergence of genotype in most cases, and every group will build up its own constitution attuned to the prevailing conditions of the environment.

There is probably no locality in which the ecological conditions remain quite static; in fact, they are always in a state of fluctuation. It is, therefore, to the advantage of any population to develop a genotype with a wide angle of adaptability and tolerance to enable it to cope with environmental changes. Too much specialised adaptation to existing conditions may prevent modifications necessary to conform to new requirements which arise when conditions change.

During complete spatial isolation—there is not time to consider other types of separation which also lead to reproductive isolation—interbreeding is prevented and eventually there may be such a degree of divergence between the divided populations that a state of intersterility is reached.

Instances can be cited illustrating every degree of differentiation from forms, some non-genetical, to established species. Dowdeswell (1958) and Dowdeswell and Ford (1953) point out how the special conditions on several small islands in the Scilly Isles have led to different spot-distribution in the Meadow Brown butterfly, *Maniola jurtina* L. (Satyridae), every island having a different form.

The Silver-studded Blue butterfly, *Plebejus argus* L. (Lycaenidae), is divided into at least four subspecies in Great Britain, *P. a. argus* L., on heathland, *P. a. cretaceus* Tutt on chalk downs, *P. a. masseyi* Tutt, now believed to be extinct but formerly found on one of the Westmorland mosses, and *P. a. caernensis* Thompson from North Wales. (I have not heard of any attempts to obtain hybrids between these races but the result could be interesting.) Of course, this example of the division of a species into subspecies is only one of numerous similar cases which could be mentioned.

There is only time tonight to remind you of one other example but that is probably one of the most important instances known, important from the historical as well as the natural science aspect. I refer to Darwin's Finches. During his visit to the Galapagos Islands, Darwin

was much impressed by the way the fauna and flora varied from island to island. He noticed that on most of the islands the finches were of a different species, and from his observations he concluded that they had all developed from one founder species due to the different ecological conditions. For more details of this remarkable case of evolution I commend to you the masterly analysis of Lack (1947).

We have seen from the species definitions already given that a species is a group capable of interbreeding in the wild. From this it is a simple deduction that groups which are reproductively isolated are different species. The difficulty of using this test lies in its application, and, as mentioned earlier, the experiments of Clarke and Sheppard prove that distinct species can be induced to hybridise in captivity. The main problem is how to bring wild populations together without inhibiting their natural habits. Whether crosses occur regularly between wild populations can usually only be ascertained by long and difficult observations in the field, but the evidence is frequently there if we are capable of recognising it.

Barriers which have been effective in separating populations for perhaps hundreds of thousands of years are not usually everlasting and may eventually break down, allowing the isolated populations to meet. From our knowledge of the slowness of the evolutionary process, it is apparent that the sequel will depend largely upon whether the time spent in isolation was sufficient to build up differentiated genotypes with characteristics ensuring reproductive isolation. It is certain, by the very nature of the process, that populations are brought together in every conceivable degree of divergence.

In the first place, let us look at what happens when two populations meet after a relatively short period of separation—too short for natural selection to have produced significant divergence. They merge into one freely interbreeding population but with increased variability because of the cumulative effects of the combined genotypes.

Another stage towards specific independence is reached when the divergence arises from the occupation of different ecological niches, the development of the preference for new kinds of food, or the creation of other different habits. All of these changes tend to keep the populations apart when the barriers are removed. This type of segregation enables each population to penetrate deeply and peacefully into the area occupied by the other. There is little or no competition and the two types live side-by-side, hybridising when they meet. Independent development may continue where habits or the occupation of different ecological niches keep them apart.

When true specific status has been attained independently by two populations, the effect of their meeting will depend upon the extent to which their ecological preferences have diverged. If the change is not significant, there may be severe competition for territorial occupation and one species is then usually driven out by the other.

If, on the other hand, the attainment of distinct specificity is accompanied by changes in habits and ecological requirements sufficient

to ensure absence of serious competition the two species may overlap in their distribution and live together as sympatric species. In the event of this situation arising without any noticeable alterations in the phenotypes, two sibling species would have developed.

The whole situation is most complex, with all possible grades of development from full specific status downwards through all infra-specific categories. Any species concept is largely an abstraction and our definitions somewhat tentative and arbitrary, liable to modification with every advancement in the relevant sciences. Nevertheless, species are not just artificial categories created for convenience; they are biological entities, despite the absence of natural dividing lines to indicate where full specific status is reached. The 'species problem' is well and truly with us and must be approached realistically. We must deal with the situation as it exists, not as we would like it to be. The complexity of the problem is such that many sciences, for example, ecology, biometry, cytology, morphology, physiology and zoogeography, regularly make their contributions to the store of knowledge on the subject and the combined results must be consulted before a reliable pronouncement can be made on any current evolutionary problem. Immense progress has been made since the beginning of the century and the future must hold many startling developments for the enlightenment of posterity.

GLOSSARY.

Allelomorphs. Genes which occupy the same relative position in homologous chromosomes and undergo pairing during meiosis.

Biometry. The statistical study of living things.

Biotope. An area of land characterised by a community of plants and animals to some extent interdependent.

Chromosome. A thread-shaped body, a number of which occur in the nucleus of living cells and carry the genes.

Concept. An abstract notion.

Cytology. The study of cells.

Ecology. The study of the relations of animals and plants to their surroundings.

Gametes. Germ cells (containing one set of chromosomes) which unite in pairs to form the first cells of new organisms.

Genes. Material units of heredity, linearly arranged in the chromosomes.

Genotype. The genetic constitution of an organism.

Gynandromorphism. The condition of having secondary sexual and/or non-functional reproductive organs of both sexes in one individual.

Hermaphroditism. The condition of having functional reproductive organs of both sexes in one individual.

Heterozygous. Bearing two dissimilar alternative genetical factors. Having two different allelomorphs in the same loci of a pair of chromosomes.

Homologous chromosomes. Chromosomes which contain identical sets of genes.

Homologous genes. Genes in identical loci, which determine the same characters.

Homozygous. Having identical genes for a given character.

Inversion. Reversal of a segment of a chromosome so that the genes lie in the opposite order.

Lethal gene. A gene which so influences development that it leads to the death of the individual bearing it.

Meiosis. The process of reduction division of cells by which the chromosomes are reduced from two sets to one.

Morphology. The study of form and structure, as distinct from functions.

Mutagenic. Capable of creating mutations.

Mutation. The sudden change of a gene which is transmitted to the offspring.
The inception of a heritable variation.

Nucleus. A body containing the chromosomes and present in most cells of plants and animals.

Parthenogenesis. Development of the egg without fertilization into a new individual.

Particulate inheritance. The inheritance in an organism of distinctive paternal and maternal characters due to the discrete property of the genes which retain their individuality and do not blend with other genes.

Phenotype. The characters of an organism by which it is usually recognised, as distinct from the genetic constitution.

Physiology. The study of the processes taking place in a living organism.

Polyploid. Having more than the usual two sets of chromosomes.

Recessive. A character produced only when the genes controlling it are homozygous, i.e., its effect is otherwise masked by its allelomorph, which is dominant.

Sibling species. Species which show no easily determined differences in bodily structure from other apparently similar species, but from which they are reproductively isolated by genetical divergence.

Spatial isolation. The separation of populations by an intervening unoccupied area.

Speciation. The development of specific qualities. The evolution of species.

Sympatric. Having the same or overlapping areas of geographical distribution.

Viable. Capable of living.

Wild populations. Populations existing in natural conditions.

Zoogeography. The study of distribution of animals on the earth.

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FIELD MEETINGS, 1959.

 RIDDLESDOWN, SURREY—12th April 1959.

Leader: Mr. F. RUMSEY.

A party of ten attended this meeting. The weather was cloudy, without sun, and no butterflies were seen. The route took the party along the downs. Shortly after lunch it started to rain, and the herbage became too wet for collecting, so the party turned back and the meeting ended earlier than expected. However, several larvae of *Platyptilia gonodactyla* Schiff. were found in stems of *Tussilago farfara* L. (Coltsfoot) immediately under the seedhead, while the larvae of *Dichomeris marginella* F. were frequent in webs on juniper. *Mompha miscella* Schiff. larvae were plentiful in leaves of *Helianthemum*, many being full fed. At the base of the stems of *Carex flacca* Schreb. (*glauca* Scop.) numerous pupae of *Elachista cinereopunctella* Haw. were found by careful searching. A single larva of the local *Parectopa ononidis* Zell. was found mining a leaf of clover, and a larva of *Coleophora alcyonipennella* Koll. was also taken.

Also found were the larvae of *Nola cucullatella* L., *Campaea margaritata* L., *Opisthograptis luteolata* L., *Allophytes oxyacanthae* L., and *Oporinia dilutata* Schiff.

Among the Coleoptera recorded were *Miccotrogus picirostris* (F.), *Anthonomus pomorum* (L.), *A. pedicularius* (L.) and *Xylocleptes bispinus* (Dufts.).

 EFFINGHAM AND OCKHAM, SURREY—19th April 1959.

Leader: Mr. F. M. STRUTHERS.

Twelve members and friends attended this meeting. The weather was cool and cloudy at first with a light north-easterly wind, but later sunny intervals improved the outlook.

The party proceeded to Barnsthorns Wood and successfully searched for the larvae of *Parascotia fuliginaria* L. on fallen timber. A woodcock was flushed during the search and a nest containing four eggs was discovered.

Leaving Barnsthorns Wood the party moved on to Ockham Common and lunch was taken on Telegraph Hill. More larvae of *P. fuliginaria* L. were found near here, and larvae of *Euzophera neophanes* Durr. occurred in the fungus *Daldinia concentrica* Ces. & de Not. on burnt birches.

Some of the hibernating Vanessids were noted, including *Vanessa atalanta* L. and *Nymphalis io* L. Newly emerged examples of *Pararge aegeria* L., *Saturnia pavonia* L. and *Anarta myrtilli* L. were on the wing.

Several species of Eriocraniinae, and *Incurvaria pectinea* Haw. and *Argyrotaenia pulchellana* Haw. were seen flying during the sunny periods. Larvae of *Amelia viburnana* Schiff. & Denis were found on *Symphytum officinale* L. (Comfrey); *Iuffia lapidella* Goeze on the bark of pine; larvae and pupae of *Laspeyresia coniferana* Ratz. in the pine bark and the larva of *Pammene regiana* Zell. on sycamore.

The following Coleoptera were taken: *Cicindela sylvatica* L., *Agonum dorsale* (Pont.), *Scaphidium quadrimaculatum* Ol., *Dromius quadrimaculatus* (L.), *D. quadrinotatus* (Panz.), *Atracus affinis* (Payk.), *Lordithon trinitatus* (Er.), *L. thoracicus* (F.), *Ischnodes sanguinicollis* (Panz.), *Calvia quattuordecimguttata* (L.), *Lema melanopa* (L.), *Cylindronotus laevioctostriatus* (Goeze), *Salpingus castaneus* (Panz.), *Apion ulicis* (Forst.) and *Strophosomus sus* Steph.

Also taken was the millepede *Polyxenus lagurus* L. under Scots Pine bark and the ant *Leptothorax nylanderii* (Först.).

The party had tea at the tea rooms by the station at 4.30 p.m.

WIMBLEDON COMMON, SURREY—26th April 1959.

Leader: Mr. R. W. J. UFFEN.

After a Saturday of pouring rain the leader scarcely dared to open his curtains on the morning of this meeting. We were, however, spared a soaking, and nine members were able to enjoy a sunny day sheltered for most of the time from the cold northerly wind in the wooded Farm and Stag ravines. The racing clouds dropped only one shower, but enough to make the party wish the young oak leaves were more fully grown.

The list of Lepidoptera includes several records to indicate that spring was at last back to its traditional time of the year. The Diptera once more puzzled the leader, the Tachinidae and Syrphidae peculiar to woodlands in spring being apparently absent from Wimbledon.

The morning was spent amongst the gorse and birch of the golf course where larvae of *Epichnopteryx pulla* Esp. were found in sheltered grass beneath the bushes. An abortive search was made for *Adela cuprella* Thunb. around the salallows of Farm Bog, where a rather large psychodid "moth-fly" was admired.

In the dark wood the leaf-mining moth *Lithocolletis faginella* Zell. was common on the algae-covered tree trunks. Interesting dark forms were noted.

Members afterwards were entertained to tea by Dr. and Mrs. Dacie, at which they were joined by another member. Our thanks are due to our hosts for this pleasant ending to the meeting—and for the record of *Polychrisia moneta* F., feeding on their *Delphiniums*.

Lepidoptera noted: *Adela viridella* Scop., *Ypsolophus nemorellus* L. larvae, *Lithocolletis trifasciella* Haw., *Coleophora betulella* Hein. larvae, *C. fuscadinella* Zell. larvae, *C. pyrrhulipennella* Zell. larvae,

Elachista rufocinerea Haw., *Dasycera sulphurella* F., *Gelechia mulinella* Zell. larvae, *Aethalura punctulata* Schiff., *Apeira syringaria* L., *Lophopteryx capucina* L., *Apatele megacephala* Schiff., *Pieris napi* L., *Polygonia c-album* L., *Nymphalis io* L.

A colony of the bee *Andrena armata* Gmel. was noted.

BOX HILL, SURREY—2nd May 1959.

Leader: Mr. B. F. SKINNER.

A party of ten members and friends met at the railway station and proceeded to the stepping stones by way of the main road. The weather was mainly overcast with only an occasional sunny interval. A chilly breeze persisted throughout the day, most noticeably on the top of the downs.

Large patches of Ramsons (*Allium ursinum* L.) were in full flower on the west side of the stepping stones; no one had touched them, doubtless on account of their strong smell of garlic. On the south-facing escarpment of the hill Chalk Milkwort (*Polygala calcarea* F. Schultz) was abundant. There were three colour forms (dark-blue, bluish-white, and pink), each seeming to have its own territory.

One member found a clump of the fungus *Pholiota erebia* Fr., he also spotted in the grass a small specimen of the little discomycete fungus *Peziza rutilans* Fr. A few examples of *Tubaria furfuracea* Pers. were noted.

A number of *Pilemostoma fastuosa* Schall. (Col., Chrysomelidae) were found on *Inula conyza* D.C. in Happy Valley.

Lepidoptera were recorded as follows: *Euchloë cardamines* L., *Parage aegeria* L., *Lampropteryx suffumata* Schiff., and *Xanthorhoë spadicearia* Schiff. Larvae from yew were: *Eilema deplana* Esp., *Laspeyria flexula* Schiff., and *Deileptenia ribeata* Clerck; while *Pandemis cinnamomeana* Treits. and *Blastobasis lignea* Wals., were taken from larch.

A most enjoyable tea was had at the Fort Restaurant.

OXSHOTT, SURREY—10th May 1959.

Leader: Mr. F. D. BUCK.

A party of nine met at the station, five members and four visitors, on a very hot and sunny day. There were, however, few insects about.

The route taken varied little from that taken on countless previous meetings in this locality, across Oxshott and Esher Commons to the Black Pond and then back to Oxshott for tea.

Lepidoptera imagines seen included: *Euchloë cardamines* L., *Anarta myrtilli* L., *Drepana falcataria* L., *Ematurga atomaria* L., which was common, and *Cosymbia albipunctata* Hufn. The micro *Adela viridella* Scop. was also out.

The larvae of *Brephos parthenias* L. were plentiful and Mr. Wakely found an eriocraniid larva in some numbers mining birch leaves in the Oxshott pine area on the way back to tea.

Drosera rotundifolia L. (Round-leaved Sundew) was found sparingly both by the Black Pond and in boggy places out on the Common.

Coleoptera were not plentiful but the following were either seen or taken:—On mud near the Black Pond: *Notiophilus biguttatus* F., *N. aquaticus* L., *Dyschirius globosus* L., *Acupalpus dorsalis* F., *Bembidion lampros* Herbst, *Stenus rogeri* Kraatz. By beating: *Exochomus quadrimaculatus* L. and most of the other pine Coccinellidae, *Dalopius marginatus* L., *Lochmaea capreae* L. off willows, and *Pissodes pini* L. from pine. Under the roots of heather was found *Amara familiaris* Duft., the result of a casual examination of heather roots without a serious attempt to find *A. infima* (Dufts.). A number of pines had been felled recently and a number of small piles of pine billets had been left by the sides of some of the paths, these were too fresh to yield much and the same applied to the stumps, however a single example of *Hylurgops palliatus* Gyll. was found under the bark of one stump.

It may be remembered that the old stumps in the area showed evidence of *Asemum striatum* (L.) and it may well be worth while examining these stumps for this species in the next two or three years.

The fungus *Boletus scaber* Bull. was found in a damp spot on the Common, an unusual find for the time of the year.

Also noted was the dragonfly *Libellula quadrimaculata* L. in small numbers. Frogs in the Black Pond were exceptionally noisy, so much so that it was thought that they could not be the common frog (*Rana temporaria* L.), and it was suggested they might be the edible frog (*R. esculenta* L.). They could be seen out in the pond and certainly seemed larger than usual, but it was difficult to tell as they may well have been puffed out when croaking.

HAM STREET, KENT—16th May 1959.

Leader: Dr. E. Scott.

This was a lovely day slightly marred by a strong N.E. wind. A party of 25 met in the morning. The main collecting took place in a wide new ride through Long Rope Wood. There were wide verges with much scrub willow, aspen, etc., and half-grown trees of oak, birch, and in places conifers, of the Forestry Commission. Many species were recorded but few individuals, and larvae of Lepidoptera were scarce.

Imagines included: *Pieris rapae* L., *P. napi* L., *P. brassicae* L., *Gonepteryx rhamni* L., *Argynnis euphrosyne* L., *Pararge aegeria* L., *P. megera* L., *Coenonympha pamphilus* L., *Hamearis lucina* L. (scarce), *Callophrys rubi* L. (local), *Pyrgus malvae* L., *Erynnis tages* L., *Laethoë populi* L., *Hemaris fuciformis* L., *Drepana binaria* Hufn., *Cygnia mendica* Clerck, *Bena fagana* F. (*prasinana* L. auct. nec L.), *Panemeria tenebrata* Scop., *Phytometra viridaria* Clerck, *Ectypa glyphica* L.,



Mr. S. Wakely and Mr. T. R. Eagles collecting larvae of *Grapholita funebrana* Treits., Farningham, 20th September

Mr. S. N. A. Jacobs collecting *Leucoptera spartifoliella* Hüb. Ham Street, 16th May.



Dr. E. Scott at Ham Street, 16th May.



Euclidimera mi Clerck, *Plusia gamma* L., *Colobochyla salicalis* Schiff., *Sterrhia aversata* L., *Cosymbia porata* L., *C. albipunctata* Hufn., *Dysstroma truncata* Hufn., *Thera obeliscata* Hübn., *Scopula lactata* Haw. (*floslactata* Haw.), *Euphyia luctuata* Schiff., *Rheumaptera* (*Eulype*) *hastata* L., *Eupithecia tantillaria* Boisd., *Bapta bimaculata* F., *Cabera pusaria* L., *Chiasmia elathrata* L., *Pseudopanthera macularia* L., *Pseudoboarmia punctinalis* Scop., *Aethalura punctulata* Schiff., *Asthenia albulata* Hufn., *Anania funebris* Stroem., *Microstega pandalis* Hübn., *Stenoptilia bipunctidactyla* Scop., *Aegeria culiciformis* L. (three specimens feeding on blossom), *Phalonia nana* Haw., *Chlidonia baumanniana* Schiff., *Phtheocroa maculosana* Haw., *Capua favillaceana* Hübn., *Syndemis musculana* Hübn., *Eulia ministrana* L., *Ancylis badiana* Schiff., *A. laetana* F., *Bactra lanceolana* Hübn., *Lobesia reliquana* Hübn., *Endothenia nigricostana* Haw., *Eucosmomorpha albersana* Hübn., *Apotomis pruniana* Hübn., *Eriopsela quadrana* Hübn., *Epinotia cruciana* L., *E. tetraquetra* Haw., *E. tedella* Clerck, *Eucosma aspidiscana* Hübn., *Pammene germanana* Hübn., *P. splendidulana* Guen., *Laspeyresia servillana* Dup., *Epiblema scutulana* Schiff. Other microlepidoptera included the gelechiids *Telphusa notatella* Hübn., *T. triparella* Zell. and *T. luculella* Hübn., a picturesque insect noted by Mr. Youden running about in the crevices of oak trunks. Also *Lithocolletis cramerella* F., *Ornix betulae* Staint., *Gracillaria alchimiella* Scop., *Phylloporia bistrigella* Haw., *Adela viridella* Scop., and *Nemophora swammerdamella* L.

Larvae included: *Clostera pigra* Hufn. on aspen, *Orgyia antiqua* L., *Bombycia viminalis* F., *Amphipyra pyramidea* L., *Orthosia miniosa* Schiff., *Chesias legatella* Schiff., *Coleophora gryphipennella* Bouch. and *C. troglodytella* Dup. Pupae of *Leucoptera spartifoliella* Hübn. were numerous in their white cocoons on a broom bush. The dragonfly *Libellula depressa* L. was hawking round a large pond in which the water beetle *Agabus bipustulatus* L. was detected.

A list of Coleoptera noted during the day was submitted by Mr. E. Lewis and Mr. R. P. Coles and included: *Nebria brevicollis* (F.), under stones; *Notiophilus germinyi* Fauv. (*hypocrita* Putz.), running on ground; *N. rufipes* Curt., running on ground; *Bembidion quadrimaculatum* (L.), and on damp ground at edge of road; *B. nitidulum* (Marsh.), in same situation as above; *B. lampros* (Herbst), running on ground; *Bradycellus verbasci* (Dufts.), under moss on ground; *Abax parallelepipedus* (Pill. & Mitt.) (*ater* Villers), under stone; *Dromius linearis* (Ol.), sweeping; *Drusilla canaliculata* (F.), under stone; *Gabrius splendidulus* (Grav.), under bark of a log; *Xantholinus angustatus* (Steph.), under stone; *Neuraphes angulatus* (Mull.), in moss on ground; *Cephennium gallicum* Gangl. (*thoracicum* Müll. auct nec Müll.), in moss on ground; *Athous haemorrhoidalis* (F.), general sweeping; *Cantharis pellucida* (F.), general sweeping; *Rhagonycha limbata* (Thom.), general sweeping; *Exochomus quadripustulatus* (L.), on broom; *Meligethes viridescens* (F.), on broom; *M. erythropus* (Gyll.);

Anaspis rufilabris (Gyll.); *A. costai* Emery; *Mordella aculeata* L., under bark; *Pyrochroa serraticornis* (Scop.), one imago and numerous larvae under bark; *Clytus arietis* (L.); *Zeugophora subspinoso* (F.), on aspen; *Lochmaea capreae* (L.), on willow; *Chalcoides aurea* (Geoff.), on willow; *Longitarsus luridus* (Scop.); *Batophila rubi* (Payk.), on dock; *Bruchidius fasciatus* (Ol.), (*villosus* F. auct. nec F.), on broom; *Apion assimile* Kirby; *A. violaceum* Kirby; *Caenorhinus germanicus* (Herbst); *C. aeneovirens* (Marsh.); *Strophosomus melanogrammus* (Forst.); *Sitona striatellus* Gyll. (*tibialis* (Herbst)), on broom; *Phyllobius argentatus* (L.); *Curculio* (*Balanobius*) *pyrrhoceras* (Marsh.), on oak; *Anoplus plantaris* Naes.; *Rhamphus pulicarius* (Herbst), on broom.

WHIPPENDELL WOOD, HERTS—24th May 1959.

Leader: Mr. R. W. J. UFFEN.

The attendance at this meeting, held on a beautiful day, was even less than that on a soaking wet day last year. This was a great pity, as this is an area of great beauty, variety and interest to the naturalist.

Whippendell Wood and the adjacent Cassiobury Park are of very old standing, being recorded as passing into the hands of the Earls of Essex between 1660 and 1670 as a game preserve. They were thus maintained until Watford Corporation began to purchase the land as a public open space in 1909. Cassiobury Park was laid out by the well-known gardener Moses Cook, who in 1672 planted the magnificent row of lime trees across what is now the West Herts golf course, between the River Gade and Whippendell Wood.

Cassiobury Park is now a rather desolate place from the entomologist's point of view, being maintained in the condition of a playing field. Until 1938 Skylarks bred here in long grass grown for hay.

The Grand Union Canal now runs alongside the River Gade. Between the two are watercress beds and groves of magnificent old alders. The Orange Balsam (*Impatiens capensis* Meer.) was plentiful amongst the lush riverside vegetation, and a plant of the Great Water Dock (*Rumex hydrolapathum* Huds.) was noted. Alder-flies (*Sialis*) and Chironomid midges were abundant here.

Some tree trunks lying near the river bore the fungi *Polyporus picipes* Fr., *Trametes rubescens* (A. & S.) Fr. and *Daldinia concentrica* Ces & de Not. The last named harboured a number of very active beetles, *Mycetophagus quadripustulatus* (L.).

The trees in Whippendell Wood are most impressive. The wood appears to have been landscaped to give areas of various trees appropriate to the setting. Noble beeches line the side of a valley, oak woods with hazel coppice and large tracts of bluebells adorn the high ground, whilst a grove of specimen birches is set amongst grass with a wide variety of flowering herbs on the floor of a valley. Felling during 1939-45 has produced interesting areas of birch, hawthorn and

other scrub. Several good spindle bushes were noted. There are numbers of very tall conifers—mostly larch and spruce, the latter probably Sitka spruce, with ornamental specimens along the main rides.

It was pleasing to see an abundance of ferns. These were mostly *Dryopteris filix-mas* agg., but *D. spinulosa* (Mull.) Watt and *D. austriaca* (Jacq.) Woy. were also plentiful. Along the rides was the Yellow Pimpernel (*Lysimachia nemorum* L.).

Eggs of *Euchloë cardamines* L. were found on a few plants of *Alliaria petiolata* (Bieb.) C. & G. The attractive Pentatomid bug *Stollia fabricii* Kirkaldy was found on *Stachys* close by. Larvae of *Coleophora fuscadinella* Zell. and *C. badiipennella* Dup. were feeding in their cases on the leaves of elm.

Large numbers of the little moth *Glyphipterix fischeriella* Zell. were to be found on the masses of hawthorn blossom, lifting their wings in their characteristic manner by rubbing the hindlegs under them as though they felt uncomfortable. A Cardinal beetle (*Pyrochroa coccinea* (L.)) was attracted to the same repast, whilst the leaves of the hawthorn supported webs of *Hyponomeuta padella* L. larvae. Imagines reared from these were pure white in ground colour.

An 'Ichneumon' netted dashing to and fro over beech litter transformed itself in the net to the mimetic fungus-gnat *Apemon marginata* (Meig.). Most of the Diptera seen on this visit were numbers of a few common species, such as the tipulids *Limonia tripunctata* (F.), *Tipula vernalis* Meig., *T. oleracea* L., *Nephrotoma quadrifaria* (Meig.), *Epiphragma ocellaris* (L.) and *Limonia (Rhipidia) maculata* Meig.

A few sawflies were taken: *Tenthredopsis* sp., *Aglaostigma fulvipes* (Scop.), *Macrophya ribis* (Schrank), *Priophorus pallipes* (Lepeltier) and *Dineura virididorsata* (Retz.).

Other Lepidoptera reported were: *Gracillaria auroguttella* Steph., *Anthophila fabriciana* L., *Brachmia rufescens* Haw. larvae, *Glyphipterix fuscoviridella* Haw., *Clepsis costana* F. larvae in spun shoots of *Epilobium hirsutum* L., *Notarcha ruralis* Scop. larvae, *Pseudargyrotoza conwagana* F. common around ash trees, *Nymphalis io* L.

Thanks are due to Watford Corporation and Mr. J. D. Magee for the historical information.

CHILWORTH, SURREY—30th May 1959.

Leader: Mr. S. WAKELY.

The party were due to meet at Chilworth Station about 11 o'clock, but some arrived half an hour early and while waiting for the others the pond by the station was explored.

Large clumps of *Impatiens capensis* Meer. (Orange Balsam) were growing here and local moths noted were *Euchoeca nebulata* Scop. and *Mompha schrankella* Hübn. Several members arrived by car, so it was decided to save time by using these vehicles to convey the members to the higher ground near St. Martha's. From here the party worked

their way through the wild woodland to the south of St. Martha's. Although too late for the larvae of *Strymonidia w-album* Knoch a pupa was found attached to a leaf of wych elm, showing that the species still occurred here.

A number of common species were noted and Mr. Eagles supplied the following botanical notes:—

"It was pleasing to see in bloom three of the plants associated with the sandy soil of St. Martha's, namely *Saxifraga granulata* L. (Meadow Saxifrage), *Corydalis claviculata* (L.) DC. (White Climbing Fumitory) and *Lycopsis arvensis* L. (Bugloss). Also noted in bloom were *Arenaria serpyllifolia* L. (Thyme-leaved Sandwort), *Spergularia rubra* (L.) Presl. (Sand-spurrey), *Erodium cicutarium* (L.) L'Hér. (Common Storksbill) and *Ornithopus perpusilius* L. (Birdsfoot).

"In the wood, growing on a fallen trunk of *Prunus avium* L. (Wild Cherry), was a large specimen of the fungus *Polyporus sulphureus* (Bull.) Fr. in perfect condition, brilliant orange yellow in colour and conspicuous from many yards away as soon as the winding path brought it into view".

Lunch was had on the high ground by St. Martha's Church, after which a renewed search for *S. w-album* was made, but no more were found.

Unfortunately tea could not be obtained at Chilworth, so once more the party was transported to Newlands Corner for tea and cakes. On the tea room window there was a specimen of *Myopa buccata* L. (Dipt., Conopidae). Some of the members explored the down here and found insects much more numerous. Larvae of the plume *Capperia britanniodyctylus* Grgs. were not uncommon on wood sage and a single specimen of the local tortrix *Dichrorampha (Heminene) sequana* Hübn. was netted. Several larvae of *Coleophora albitarsella* Zell. were found on Marjoram. Numbers of the Five-spot Burnet were on the wing and several common geometers were noted on the hillside. The party numbered nine and the day was bright and sunny.

NORTH HEATH, SUSSEX—6th June 1959.

Leader: Mr. D. A. ODD.

A fine day greeted the small number of members at Pulborough who journeyed to the leader's house before starting to walk through the local woods and commonland. A number of species of Lepidoptera were noted, including the following: *Pararge aegeria* L., *P. megera* L., *Maniola jurtina* L., *Ochlodes venata* Br. & Grey, *Pieris napi* L., *P. brassicae* L., *Polyommatus icarus* Rott., *Ricula sericealis* Scop., *Euphyia bilineata* L., *Pseudopanthera macularia* L., *Xanthorhoe montanata* Schiff., *Lithina chlorosata* Scop., *Dysstroma truncata* Hufn., *Olethreutes lacunana* Schiff., *Scoparia dubitalis* Hübn., *Ptycholoma lecheana* L., *Anthophila fabriciana* L., *Plusia chrysitis* L., and *Euclidimera mi* Clerck.

Among the lepidopterous larvae found were *Thecla betulae* L., and *Gortyna flavago* Schiff., in thistle stems. In addition, a fine variety of wild flowers were noted, including *Orchis maculata* agg. (Spotted Orchis), and *O. mascula* L. (Early Purple Orchis).

After a delightful day, tea was generously provided by Mrs. Odd at the leader's house.

HIGH HALSTOW, KENT—13th June 1959.

(Northward Hill Nature Reserve).

Leader: Mr. A. W. GOULD.

The interests of the party of eleven members and friends visiting the Northward Hill Nature Reserve covered a wider field than usual, and it was good to see spiders, bugs and flies receiving the close attention usually reserved for Lepidoptera and Coleoptera.

The day was hot and fine, and shade from the old oaks lining the high plateau at the eastern end of the wood was very welcome at lunch time. The weather had been dry for some time and the London clay, on which most of the wood stands, was parched and cracked; small water pans were almost dry, and beetles were scarce.

The microlepidopterists were hoping to find earlier stages of *Hyponomeuta irrorella* Hübn., rediscovered here last year, and they were not disappointed. Larvae and pupae of this, and three other species of the same genus were found on *Euonymus europaeus* L.

Most of the birds were away from the nests in the heronry, but some adults still remained to give their harsh warning cries. While quietly back-tracking to look for a missing arachnologist, the leader noted an interesting association under the herons' trees. Three large brown rats were foraging for scraps among the lush green nettles that grew in the nitrogenous soil.

Thanks for permission to visit the Reserve are due to the Nature Conservancy and to the Royal Society for the Protection of Birds, whose warden keeps watch over the birds.

The following species were recorded by members present:

Lepidoptera. Imagines: *Pararge aegeria* L., *P. megera* L., *Coenonympha pamphilus* L., *Polyommatus icarus* Rott., *Ochlodes venata* Br. & Grey, *Agrotis exclamantis* L., *Ectypta glyphica* L., *Nemotois degeerella* L., *Anthophila fabriciana* L. commonly, *Eucosma pflugiana* Haw., *Epinotia trimaculana* Don. commonly, *Crambus pratellus* L. Larvae or pupae: *Hyponomeuta irrorella* Hübn., *H. cognatella* Hübn. and *H. plumbella* Schiff. on *Euonymus europaeus* L.; *Hyponomeuta padella* L., on hawthorn; *Tortrix viridana* L., on oak; *Notocelia udmanniana* L., on bramble; *Coleophora lutipennella* Zell., on elder under oak; and *C. badiipennella* Dup. and *C. fuscadinella* Zell., on elm.

Hemiptera-Heteroptera: *Psallus varians* (H.-S.), on willow; *P. diminutus* Kirsch. and *Hylopsallus perrisi* Muls., on oak; *Capsus ater* L., *Leptopterna ferrugata* (Fallen) and *L. dolabrata* (L.), swept from grasses.

Coleoptera: *Bembidion guttula* (F.), *Helophorus nubilus* F., on damp clay on open ground, *H. brevipalpis* Bed., *Gnypeta carbonaria* (Marsh.), *Atheta* (*Tetropla*) *liturata* (Steph.), *A. (T.) crassicornis* (F.), *Lordithon lunulatus* L., *Scaphidium quadrimaculatum* Ol., *Scaphisoma agaricinum* (L.), *Malachius bipustulatus* (L.), *M. viridis* F., *Cryptocephalus moraei* (L.), *C. fulvus* Goeze, *C. labiatus* (L.), *Chrysolina staphylea* (L.), *Anthonomus rubi* (Herbst), *Rhynchaenus quercus* (L.), and *R. alni* (L.).

Arachnida: *Dictyna latens* (F.), *Clubiona reclusa* O. P.-Cambridge, *C. brevipes* Blackwall, *Anyphaena accentuata* Walckenaar, *Misumena ratia* (Clerck), *Philodromus aureolus* (Clerck) and its variety *caespiticolis* Walckenaar, *Xysticus cristatus* (Clerck), *Salticus scenicus* (Clerck), *Ballus depressus* (Walckenaar), *Euophrys frontalis* (Walckenaar), *Heliophanus flavipes* C. L. Koch, *Lycosa tarsalis* Thorell, *L. nigriceps* Thorell, *Pisaura mirabilis* (Clerck), *Theridion vittatum* C. L. Koch, *T. sisyphium* (Clerck) was abundant, *T. varians* Hahn, *T. ovatum* (Clerck) was abundant, *T. bimaculatum* (L.), *Episinus angulatus* Blackwall, *Tetragnatha montana* Simon, *T. extensa* (L.), *T. obtusa* C. L. Koch, *Meta segmentata* (Clerck), s.sp. *mengei* (Blackwall) was abundant, *Zilla diodia* Walckenaar, *Linyphia hortensis* Sundervaal, *Gongylidium rufipes* Sundervaal, *Erigone atra* (Blackwall), and *Bathypantes parvulus* (Westring). All the species listed above are common, except perhaps *Zilla diodia* Walckenaar.

OTFORD, KENT—21st June 1959.

Leader: Mr. E. E. J. TRUNDELL.

Eight members attended this meeting in cloudy but otherwise fine weather.

In spite of the fine early summer very few species of butterflies were noted, but some fresh *Argynnis aglaia* L. gave the younger members good exercise on the steep slopes of the hillside. A few early *Lysandra coridon* Poda were taken and one or two late *L. bellargus* Rott. were still on the wing.

The moths recorded were as follows: larvae of *Eremobia ochroleuca* Schiff., imagines of *Philereme transversata* Hufn., *Hydrelia flammeolaria* Hufn., *Rhodaria cespitalis* Schiff., *Microstega hyalinialis* Hübn., *Pempelia dilutella* Hübn., *P. ornatella* Schiff., *Hypochalcia ahenella* Hübn., *Phycita semirubella* Scop., *Euzophera suavella* Zinck., *Stenoptilia pterodactyla* L., *Marasmarcha lunaedactyla* Haw., *Oxyptilus parvidactyla* Haw., *Alucita tetradactyla* L. and *Scythris senescens* Staint.

No records of other insects were made but Mr. N. Hammond has noted the following spiders, all common: *Dictyna arundinacea* L., *Clubiona brevipes* Blackw., *Anyphaena accentuata* Walck., *Philodromus dispar* Walck., *P. aureolus* Clerck, *P. aureolus* s.sp. *caespiticolis* Walck., *Pisaura mirabilis* Clerck, *Theridion ovatum* Clerck, *T. varians* Hahn., *T. sisyphium* Clerck, *Tetragnatha extensa* L., *Meta segmentata* Clerck



ST. MARTHA'S, SURREY. 30th May 1959.

*Left to right: C. L. Nissen, H. G. Tunstall, Dr. J. V. Dacie, F. Rumsey,
A. S. Wheeler, R. F. Richards, T. R. Eagles, H. G. Denvil.*



OTFORD, KENT. 21st June 1959.

*Left to right: J. M. Chalmers-Hunt, A. S. Wheeler, S. Wakely, F. Rumsey,
N. Hammond, J. A. C. Greenwood, N. Wilding*

s.sp. *mengei* Blackw., *Araneus cucurbitinus* Clerck and *Linyphia hortensis* Sund.

Tea was taken at the Oast House, Otford.

ASHDOWN FOREST, SUSSEX—28th June 1959.

Leader: Mr. S. Wakely.

Eight members attended this meeting and the weather was perfect. Meeting at Forest Row station, the party proceeded by cars to the forest, thanks being due to the two car owners.

Most of the collecting was done on boggy ground where *Narthecium ossifragum* (L.) Huds. (Bog Asphodel) was growing in profusion. Several *Diacrisia sannio* L. were netted together with *Cybosia mesomella* L. and *Ortholitha mucronata* Scop. Single specimens of *Hadena contigua* Schiff. and *Leucania pudorina* Schiff. were taken. Numerous larvae of *Cerura vinula* L. were found on dwarf willow and aspen—some just hatched and others full fed. Dwarf willow yielded larvae of *Harpyia (Cerura) furcula* Clerck and *Clostera pigra* Hufn. Both larvae and imagines of *Anarta myrtili* L. were noted.

Interesting micros netted included *Crambus pascuellus* L., *C. uliginosellus* Zell., *Dioryctria palumbella* F. and *Scythris grandipennis* Haw.

Numbers of larvae of *Ancylys apicella* Schiff. (*siculana* Hübn.) were found in spun leaves of alder buckthorn and larvae of *Gonepteryx rhamni* L. were found on the leaves of the same plant. A full-fed larvae of *Saturnia pavonia* L. was also found on alder buckthorn which later yielded another which was much smaller. A small pupa found in spun leaves of willow later emerged as *Gelechia sororculella* Hübn.

Mr. N. Hammond has contributed a list of the spiders which he noted, and this is appended at the end of this report. The specimen of *Atypus affinis* Eich. (trap-door spider) was found by Mr. E. E. Syms, who was familiar with the kind of ground on which this local species is likely to occur. Two specimens of *Micrommata virescens* (Clerck) were taken by members of the party and given to Mr. Hammond; this is a large, striking green-coloured local spider.

Some excitement was caused by a member who netted a very lively and vicious looking adder which was later released.

About 4.30 p.m. the party were once more taken back to Forest Row by car, where tea was enjoyed by all in the large garden of a guest house.

The list of spiders noted is as follows: *Theridion sisypium* (Clerck), abundant; *T. denticulatum* (Walck.); *Robertus lividus* (Blackw.); *Meta segmentata* (Clerck) s.sp. *mengei* (Blackw.), abundant; *Araneus umbraticus* (Clerck); *Cyclosa conica* (Pallas), immature; *Mangora acalypha* (Walck.); *Lycosa pullata* (Clerck); *L. nigriceps* Thor.; *Evarcha arcuata* (Clerck), common; *Salticus scenicus* (Clerck); *Atypus affinis* Eich.; *Agelena labyrinthica* (Clerck), common; *Amaurobius*

terrestris (Wid.); *Pisaura mirabilis* (Clerck); *Micromatta virescens* (Clerck); *Lepthyphantes obscurus* (Blackw.); *L. zimmermanni* (Bertk.); and *Oedothorax fuscus* (Blackw.).

BLACK PARK, BUCKS.—5th July 1959.

Leader: Mr. W. E. Minnion.

Only two members joined the leader for this meeting. In the fir and pine plantations moths were plentiful but not very varied. *Semiothisa liturata* Clerck, *Chloroclystis coronata* Hübner, *Eupithecia lariciata* Freyer and a dark form of *Alcis* (*Cleora*) *repandata* L. being very frequent. *Eupithecia pulchellata* Steph. and *Eilema deplana* Esp. were also seen.

Lunch was taken by the lake and dragonflies were extremely numerous. Unfortunately none of us could identify them though it seemed likely that seven or eight species were present.

The clump of the rare introduced plant *Lisichitum americanum* Hultén & St. John (Skunk Cabbage) was visited but was found to be rather overgrown by young alders. Two species of waterlily were in flower, *Nymphaea alba* L. and *Nuphar lutea* (L.) Sm.

This was a day when temperatures reached the nineties and it was very sultry. As a result the meeting finished early in the afternoon.

Microlepidoptera recorded were: *Fumea casta* Pall., *Crambus pascuellus* L., *Endotricha flammealis* Schiff., *Scoparia ambigua* Treits., *Cataglyphis stagnata* L., *Notocelia uddmanniana* L., *Gypsonoma dealbana* Fröl., *Epinotia tedella* Clerck, *E. solandriana* L., *Olethreutes* (*Argyroploce*) *lacunana* Schiff., *Argyresthia goedartella* L., *A. brockeella* Hübner.

Mr. N. Hammond reports the following spiders: *Philodromus aureolus* (Clerck) (Thomisidae) male and female; *Lycosa lugubris* (Walck.) (Lycosidae) female; *Pisaura mirabilis* (Clerck) (Pisauridae) female; *Theridion ovatum* (Clerck) female, *T. denticulatum* (Walck.) male, and *T. lunatum* (Clerck) females, (Theridiidae); *Tetragnatha extensa* (L.) male, and *T. montana* Sim. female (Tetragnathidae); *Araneus umbraticus* Clerck male and *Cyclosa conica* (Pallas) female (Argiopidae). All are common species except *Theridion lunatum* which is described by Locket and Millidge as "rather uncommon". Species taken in the immature stage and not identifiable with certainty are not included in the above list.

DUNGESS, KENT—12th July 1959.

Leader: Mr. J. M. CHALMERS-HUNT.

The day was fine and sunny, and the temperature moderate, but a fairly strong wind persisted throughout the day and rather hampered operations. Altogether ten people, including several visitors, met at Lydd Halt station, and proceeded to work the area between there and the lighthouse.

Among the Lepidoptera, a single imago of *Earias clorana* L. was taken by the Long Pond. Beating gorse bushes near the derelict school produced several micros, the most interesting being a melanic *Endotricha flammealis* Schiff., and a single example of *Batia lambdella* Don. Those who wanted *Calophasia lunula* Hufn. found a few larvae, but it is probable that these would have been commoner ten days earlier.

Some interesting Coleoptera were taken. Those recorded by Mr. M. G. Morris who worked for Curculionidae were: *Apion sedi* Germ., *A. curtirostre* Germ., *A. miniatum* Germ., *A. rubens* Steph., *A. carduorum* Kirby, *A. meliloti* Kirby, *A. striatum* Kirby, *A. immune* Kirby, *Otiorrhynchus ovatus* (L.), *Sitona regensteinensis* (Herbst), *Smicronyx jungermanniae* (Reiche), *Tychius meliloti* Steph., *T. tibialis* Boh., *Phytonomus venustus* (F.), *Ceuthorrhynchus geographicus* (Goeze), *Nanophyes marmoratus* (Goeze), *Gymnetron antirrhini* (Payk.). Coleoptera taken by Mr. D. G. Hall included *Orthochaetes setiger* (Beck), *Cryptocephalus fulvus* Goeze and *Rhyzobius litura* (F.).

Enallagma cyathigerum (Charp.) (Odonata), and the Arachnid *Tetragnatha extensa* (L.) on *Carex pendula* L., were noted.

The day concluded with an enjoyable tea at the Lighthouse Café.

————— RANMORE, SURREY—19th July 1959.

Leader: Mr. T. R. EAGLES.

Five members and one visitor attended. There was continuous sunshine and the heat was intense.

From Boxhill Station the party walked along the Great Bookham road as far as Bagden Farm and thence through the woods to Ranmore Common. After a short spell on the Downs they returned to the Common for cups of tea and soft drinks near the Car Park. They then walked through the woods by another path, passed Bagden Farm again and proceeded along the road back to the station.

Many larvae of *Cosymbia linearia* Hübn. and one or two of *Colocasia coryli* L. were beaten from beech. These were very small and it was impossible to find the latter by searching. Larvae of *Dasychira pudibunda* L., *Bapta temerata* Schiff. and *Bena fagana* F. (*prasinana* L. auct nec L.) were also found on the beating trays.

The butterflies *Gonepteryx rhamni* L., *Argynnis paphia* L., *Aglais urticae* L., *Vanessa atalanta* L., *Pararge aegeria* L., *P. megera* L., *Eumenis semele* L., *Lysandra coridon* Poda, *Celastrina argiolus* L. and *Thymelicus sylvestris* Poda were on the wing, also a few moths including *Eilema deplana* Esp., *Campaea margaritata* L., *Ectropis crepuscularia* Hübn., *Rhodaria aurata* Schiff. and *Hapalia lutealis* Hübn.

The pond on Ranmore Common was nearly dried up after the long rainless spell. In the stems of *Typha latifolia* L. were fully-fed larvae of *Nonagria typhae* Thunb.

One of the party was fortunate enough to get a good view of a small deer—no doubt the Japanese deer or sika, *Sika nippon* (Temminck), descended from introduced stock.

The Nettle-leaved Bell-flower, *Campanula trachelium* L., was in full flower and very noticeable. One of the oaks in the wood provoked discussion and was found to be a hybrid, *Quercus petraea* (Matt.) Liebl. \times *robur* L. By the roadside near the ruined church were large clumps of comfrey—apparently *Symphytum asperum* Lepech. At intervals along the hedgerow were plants of Cherry-plum or Myrobalan Plum *Prunus cerasifera* Ehrh. They were heavily cut back and might be mistaken for sloe. In Clapham, A. R., Tutin, T. G., and Warburg, E. F., *Flora of the British Isles*, it says: "Introduced. Frequently planted in hedges in many parts of England, often far from houses but apparently not truly naturalized".

Mr. Norman Hammond studied the spiders, and his report is appended:—

"Few mature spiders were seen. The ten species taken were:—*Anyphaena accentuata* (Walck.), immature, *Misumena vatia* (Clerck) female, *Philodromus aureolus* (Clerck) var. *caespiticolis* Walck. female, *Lycosa pullata* (Clerck) male, *Theridion ovatum* (Clerck) female, *Meta segmentata* (Clerck) s.sp. *mengei* (Bl.) female, *Araneus cucurbitinus* Clerck female, *Lepthyphantes zimmermanni* Bertk. female, *Lanyphia triangularis* (Clerck) males, *L. peltata* Wid. female. All are common. It is very odd, however, to find a male *Lycosa pullata* at this time of year; they are normally mature in April and early May. I am quite unable to account for finding it. I also have three immature males which I am hoping to bring to maturity, when I shall be able to identify them. The large sheet webs of *Agelena labyrinthica* (Clerck) were conspicuous in the hedge-rows".

The nomenclature of the spiders is in accordance with Locket and Millidge, 1951 and 1953, *British Spiders*.

ADDINGTON, SURREY—25th July 1959.

Leader: Mr. B. F. SKINNER.

Six members met at the rendezvous and proceeded by car along Featherbed Lane to the Downs. The weather was sunny and hot. Fortunately a slight breeze prevented the temperature becoming too unpleasant. After lunch, the party left the Downs and made their way through Frith Wood towards Selsdon Bird Sanctuary. Here, the more energetic members spent their time chasing *Argynis paphia* L. as they sped up and down the grassy slope facing the bird sanctuary.

As the party were returning along Courtwood Lane they were met by another member and his wife; all then returned to Addington Village where tea was taken at the Farm House Tea Shop.

Lepidoptera noted included: *Pararge aegeria* L., *P. megera* L., *Polymmatius icarus* Rott., *Celastrina argiolus* L., *Lycaena phlaeas* L.,

Thecla quercus L., *Strymonidia w-album* Knoch, *Gonepteryx rhamni* L., *Thymelicus sylvestris* Poda, *Ortholitha chenopodiata* L., *Melanthia procollata* Schiff., *Opisthograptis luteolata* L., *Chiasmia clathrata* L., *Rhodaria aurata* Schiff., *Crambus culmellus* L., *Acleris aspersana* Hüb., *Chlidonia subbaumanniana* Wilk., and *Nemotois scabiosella* Scop.

The following spiders were reported by Mr. N. Hammond: *Xysticus cristatus* Clerck, *Tibellus oblongus* (Walck.), *Agelena labyrinthica* (Clerck), *Theridion ovatum* (Clerck), *Tetragnatha extensa* (L.), *Meta segmentata* (Clerck), *Araneus diadematus* Clerck, *A. quadratus* Clerck, *A. redii* (Scop.), *Gonatium rubens* (Blackwall), *Pisaura mirabilis* (Clerck), *Linyphia triangularis* (Clerck), and the following two which were the most interesting species, *Singa pygmaea* (Sund.), and *Entelecara flavipes* (Blackwall).

ASHTEAD, SURREY—1st August 1959.

Leader: Mr. R. W. J. UFFEN.

Mr. F. Rumsey who should have led this meeting was, unfortunately, ill and so his place was taken by the Field Meetings Secretary.

Eight members attended the first field meeting to be held at Ashtead since the disastrous fire there some years ago. The day was spent entirely on the open slope above Ashtead station, the woods being scarcely penetrated. Microlepidopterists were content to spend their time flushing series of a number of unusually common species from the coarse herbaceous vegetation.

The most abundant plants on the slope were probably *Deschampsia caespitosa* (L.) Beauv., *Juncus effusus* L., *Cirsium arvense* (L.) Scop., *Senecio erucifolius* L., *Epilobium hirsutum* L., *Pulicaria dysenterica* (L.) Bernh. A belt of *Pastinaca sativa* L. bordered a ditch, whilst a belt of *Ulex minor* Roth. separated the rough open ground from the *Pteridium*, *Crataegus*, *Deschampsia* and *Cirsium palustre* (L.) Scop. leading into the oak woods.

The leader swept for trypetid flies and searched for larvae of a few species. The impressive *Ictericia westermanni* (Meig.) was plentiful, and the abundance of hymenopterous parasites testified to the large population of *Urophora cardui* (L.) and other species.

The much overlooked gelechiid moth *Isophrictis tanacetella* Schrank was in numbers here, as at Bookham, on a limited quantity of *Achillea ptarmica* L. An abundance of mainly worn *Paltodora cytisella* Curt. amongst the bracken produced an anxious moment of confused identity.

A member searching the stems of *Cirsium palustre* L. (Scop.) for larvae of *Gortyna flavago* Schiff. found the larva of a hoverfly. Similar larvae found at Bookham last year were reared this May and proved to be *Chilomyia* (*Cheilosia*) *albipila* (Meig.). Larvae of *Epiblema scutulana* Schiff. (Lep., Tortricidae) in the same stems seemed to be of all sizes.

The meeting concluded with tea at a shop in Ashted High Street. The dull weather turned to rain as members were taken back to the station in a criminally overloaded car.

Spiders recorded were: *Clubiona reclusa* O. P.-C. (Clubionidae); *Misumena vatia* (Clerck), *Xysticus cristatus* (Clerck), *Philodromus aureolus* (Clerck) s.sp. *caespiticolis* Walck., and *Tibellus oblongus* (Walck.) (Thomisidae); *Lycosa pratigava* L. Koch (Lycosidae); *Tetragnatha extensa* (L.) and *Pachygnatha clercki* Sund. (Tetragnathidae); *Araneus gibbosus* (Walck.) and *A. diadematus* Clerck (Argiopidae); *Dismodicus bifrons* (Blackw.), *Gonatium rubens* (Blackw.), *Erigone dentipalpis* (Wid.), *Linyphia triangularis* (Clerck) and *L. pusilla* Sund. (Linyphiidae). All of which are common species.

Coleoptera: *Carabus problematicus* Herbst s.sp. *gallicus* Géhin, *Dromius linearis* (Ol.), *Psylliodes dulcamarae* Koch, *Apion miniatum* Germ., all recorded before.

Lepidoptera: *Leucoptera lotella* Staint. larvae, *Bucculatrix ulmella* Zell., *Epiblema trigeminana* Steph., *Eucosma expallidana* Haw., *E. campoliliana* Schiff. common, *Crambus culmellus* L., *C. tristellus* Schiff., *C. pascuellus* L., *Hapalia lutealis* Hübn., *Ortholitha chenopodiata* L., *Callimorpha jacobaeae* L. larvae, *Smerinthus ocellata* L. larvae, *Polyommatus icarus* Rott., *Nymphalis io* L., and *Maniola tithonus* L.

HIGHAM SALTINGS, KENT—9th August 1959.

Leader: Mr. E. E. J. TRUNDELL.

This meeting, attended by nine members, commenced with a deluge of rain; fortunately this cleared within half an hour and the rest of the day was fine.

Permission to use a private road enabled members to reach the saltings by car. Mr. Wakely noted a 'likely spot' on the way and made a request to visit it on the way back.

The hot work of collecting was relieved by pauses to watch the busy river traffic. Nothing spectacular was noted on the saltings by the lepidopterists, but Mr. N. Hammond reported that he had certainly 'struck gold', having taken ten species of spiders, three of which were local and two rare—one is probably a new county record. His list is as follows: *Clubiona phragmitis* C. L. Koch (Clubionidae), a local species; *Lycosa purbeckensis* O.P.-C. (Lycosidae) also a local species; *Tetragnatha extensa* L. and the rare *Eugnatha striata* C. L. Koch (Tetragnathidae); *Araneus quadratus* Clerck and *A. cornutus* Clerck (Argiopidae); *Linyphia impigra* O.P.-C. a local species, *Erigone dentipalpis* Wid., *E. atra* Blackw., and *E. vagans* Aud. (Linyphiidae). Of the last named species Locket & Millidge, 1953, give the following localities: 'near Hull (Yorkshire) on salt flats; Staffordshire; and in Finchley (London) where it has been found swarming in sewage filter beds'. On the way back to tea at the leader's house, a pause was made at Mr. Wakely's 'likely spot' and within a few minutes he had taken, for the first time, a specimen of the local *Evergestis extimalis* Scop.; and before trespassing members

were ordered off the precincts of the Celactite Works, where the food plant was growing freely, several more examples had been taken.

A list of the more interesting Lepidoptera is as follows: two larvae of *Vanessa cardui* L. on *Malva sylvestris* L., *Gonepteryx rhamni* L., *Maniola tithonus* L., *Thymelicus lineola* Ochs., *Gnophos obscurata* Schiff., *Cataclysta lemnata* L., *Evergestis straminealis* Hübn., *E. extimalis* Scop., *Mesographe forficalis* L., *Homocosoma binacvella* Hübn. (larvae), *Myelois cribella* Hübn. (larvae), *Agdistis bennettii* Curt., *Platyptilia gonodactyla* Schiff., *Eucosma farfarae* Fletch., *E. aemulana* Schlag., *Aristotelia stipella* Hübn., larvae in leaves of *Atriplex*, *Eupithecia centauriata* Schiff., *Crambus perlellus* Scop., *C. latistrius* Haw. and *C. selasellus* Hübn.

HORSLEY, SURREY—16th August 1959.

Leader: Mr. F. M. STRUTHERS.

A party of seven members met at Horsley Station and proceeded direct to Sheepleas by car, arranging tea on the way. It was a warm, clear, sunny day, typical of many we have had this summer.

Taking the track by St. Mary's Church, members worked the slopes of the valley and the surrounding woodland. Although quite a variety of insects were on the wing, the numbers of each species observed were surprisingly few, the exception being *Lycaena phlaeas* L. which was abundant. Several large clumps of *Atropa belladonna* L. were seen in fruit.

Amongst the Lepidoptera seen or taken were *Gonepteryx rhamni* L., *Nymphalis io* L., *Pararge aegeria* L., *P. megera* L., *Maniola jurtina* L., *Coenonympha pamphilus* L., *Aricia agestis* Schiff., *Polyommatus icarus* Rott., *Lysandra coridon* Poda, *Rivula sericealis* Scop., *Anaitis plagiata* L., *Lygris mellinata* F., *Ortholitha chenopodiata* L., *Epirrhoe alternata* Müll., *Chiasmia clathrata* L., *Nomophila noctuella* Schiff., *Rhodaria purpuralis* L., *Euxanthus hamana* L., *Pandemis corylana* F., *Stomopteryx taeniolella* Zell., *Mompha ochraceella* Curt., *Ypsolophus scabrellus* L., *Crambus inquinatella* Schiff., and *C. tristella* Schiff.

Eggs of *Macrothylacia rubi* L. were found on the grass stems, and galls, mostly empty, of *Mompha nodicolella* Fuchs were numerous on the willowherb.

Mr. F. G. Smith recorded the following Diptera, Syrphidae: *Platychirus scutatus* (Meig.), *P. albimanus* (F.), *Melanostoma mellinum* (L.), *Syrphus vitripennis* Meig., *S. ribesii* (L.), *S. corollae* (F.), *S. luniger* Meig., *S. balteatus* (Deg.), *Rhingia campestris* Meig., *Eristalis pertinax* (Scop.), *E. intricarius* (L.), *E. arbustorum* (L.), *Helophilus pendulus* (L.).

The following list of Arachnida was supplied by Mr. N. Hammond: *Misumena vatia* (Clerck), *Evarcha falcata* (Clerck), *Lycosa lugubris* (Walck.), *Pisaura mirabilis* (Clerck), *Pachygnatha degeeri* (Sund.), *Meta segmentata* (Clerck), *Araneus diadematus* (Clerck), *A. quadratus* (Clerck), *Cercidia prominens* (West.), *Dismodicus bifrons* (Blackw.),

Gonatium rubens (Blackw.), *Meioneta rurestris* (Koch), *Lepthyphantes cristatus* (Menge), *Helophora insignis* (Blackw.), *Linyphia triangularis* (Clerck).

An enjoyable tea was had in the gardens of the Thatchers Hotel at about 4.30 p.m.

PRINCES RISBOROUGH, BUCKS.—23rd August 1959.

Leader: Mr. F. G. SMITH.

Eight members met at Princes Risborough station, where transport was provided to the collecting site, the scarp of the Chilterns. The weather was perfect, and members were able to enjoy the wonderful views across the Aylesbury vale. Several colour photographs were taken, which it was hoped to show at the Society's lantern evening at the end of the year.

Lunch was taken at the Plough Inn, Cadsden, one of the attractions of the area, and certainly most welcome on such a warm day.

Lepidoptera were reported as follows: *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Aglais urticae* L., *Pararge aegeria* L., *P. megera* L., *Coenonympha pamphilus* L., *Aricia agestis* Schiff., *Polyommatus icarus* Rott., *Lysandra coridon* Poda, *Drepana cultraria* F., *Amathes xanthographa* Schiff., *Plusia gamma* L., *Anaitis plagiata* L., *Ortholitha bipunctaria* Schiff., *O. chenopodiata* L., *Euphyia bilineata* L., *Ennomos quercinaria* Hufn., *Nomophila noctuella* Schiff., *Pyrausta nigrata* Scop., *Rhodaria purpuralis* L., *Crambus culmellus* L., *C. inquinatellus* Schiff., *C. tristellus* Schiff., *Stenoptilia bipunctidactyla* Scop., *Alucita pentadactyla* L., *Pseudargyrotoza convagana* F., *Acleris aspersana* Hübn., *A. sparsana* Schiff. & Den., *Ypsolophus parenthesellus* L. (*costellus* F.) and *Plutella maculipennis* Curt.

Empty cases of *Coleophora nutantella* Mühl. were found on *Silene*.

Typhlocybae (Hem., Cicadellidae) taken by Mr. B. M. Gerard were: *Zygina hyperici* (H.-S.) on *Hypericum*; *Typhlocyba rosea* (L.), *Cicadella atropunctata* (Goeze) and two *Empoasca* species all on aspen; *Empoasca* sp. on privet; a female *Empoasca* and *Typhlocyba cruenta* H.-S. on birch and *T. cruenta* also on beech; *T. quercus* (F.), *Erythro-neura flammigera* (Geoff.), *E. angusta* (Lethierry) and *Cicadella atropunctata* (Goeze) all on *Prunus*; *C. notata* (Curt.) and *C. signatipennis* (Boh.) by general collecting.

Messrs C. Carter and N. Hammond worked for spiders and recorded the following species: *Xysticus cristatus* (Clerck) and *Tibellus oblongus* (Walck.) (Thomisidae); *Heliophanus flavipes* C.L.K. (Salticidae); *Lycosa lugubris* (Walck.) (Lycosidae); *Meta segmentata* (Clerck), *Araneus diadematus* Clerck, *A. quadratus* Clerck, *A. redii* (Scop.), *Cercidia prominens* (Westr.) recorded as uncommon by Lockett & Millidge (1953, British Spiders, 2: 159) and *Zygiella atrica* (C.L.K.) (Argiopidae); *Gonatium rubens* (Blackwall), *Meioneta rurestris* (C.L.K.) and *Lepthyphantes zimmermanni* Bertk. (Linyphiidae).

HALLING, KENT—30th August 1959.

Leader: Mr. M. G. MORRIS.

The day was warm and sunny at first but the dried-up state of the vegetation was not a good sign for an abundance of insects, and so it proved. Nine members and friends attended but three of these left at midday for (one hopes) a more profitable area. A field which had been found to be productive at past meetings here had been mown, while much of the adjacent land had been burnt. Lepidoptera were scarce and only common species were observed, such as *Hypena proboscidalis* L., *Calothyranis amata* L., *Ortholitha bipunctaria* Schiff., *Pararge megera* L., *Maniola jurtina* L., *Coenonympha pamphilus* L., *Polyommatus icarus* Rott., and *Pieris rapae* L.

Lunch was taken on top of the downs with a fine view across the Medway Valley to the chalk downs above Wouldham and Burham, somewhat spoiled by the cement works. After lunch the party worked the woods on top of the chalk and walked through to Upper Halling. *Echium vulgare* L. and *Reseda* spp. were worked for Curculionidae, without success, but a single *Gymnetron collinum* (Gyll.) was swept from *Linaria vulgaris* Mill. This is a very local weevil. *Verbascum lychnitis* L. was also observed.

At one spot several nymphs of an *Ectobius* sp. were found, together with other insects, including *Stygnocoris rusticus* (Fall.), now rather a local bug in Kent. An ant, later identified as a worker of *Ponera coarctata* (Lat.), attracted some discussion. The party emerged at Upper Halling having found the woods as unproductive as the downland. Here *Apion* spp. were beaten from Mallow, all the four usual species being present except *A. rufirostre* (F.). As there were no facilities for tea the party dispersed after a disappointing day for most groups of insects.

The following were recorded: Heteroptera: *Stygnocoris rusticus* (Fall.), *S. pedestris* (Fall.), *Drymus sylvaticus* (F.), *Nabis fesus* (L.), *N. rugosus* (L.), *N. apterus* (F.), *N. major* Costa, *Anthocoris nemorum* (L.), *Orius majusculus* (Reuter), *Phytocoris varipes* Boh., *Dicyphus epilobii* Reuter. Coleoptera Curculionidae: *Apion malvae* (F.), *A. aeneum* (F.), *A. radiolus* Kirby, *A. ulicis* (Forst.), *A. flavimanum* Gyll., *A. tenue* Kirby, *A. dichroum* Bedel, *Miccotrogus picirostris* (F.), *Anthonomus rubi* (Herbst), *Ceuthorrhynchidius troglodytes* (F.), *Gymetron collinum* (Gyll.).

Other Coleoptera: *Paederus litoralis* Grav., *Bruchidius fasciatus* (Ol.).

The following list of Spiders was provided by Mr. N. Hammond: *Misumena vatia* (Clerck), *Xysticus cristatus* (Clerck), *Oxyptila trux* (Blackw.), *Lycosa pullata* (Clerck), *L. lugubris* (Walck.), *Pisaura mirabilis* (Clerck), *Ero furcata* (Villers), *Pachygnatha degeeri* Sund., *Meta segmentata* (Clerck), *Araneus diadematus* Clerck, *A. quadratus* Clerck, *A. redii* (Scop.), *Gonatium rubens* (Blackw.), *G. rubellum* (Blackw.), *Drapetisca socialis* (Sund.), *Linyphia triangularis* (Clerck).

EAST MAILING RESEARCH STATION, KENT—5th September 1959.

Leader: Mr. M. G. MORRIS.

Some little trouble had been taken by the Staff of the Research Station to arrange this meeting, at the request of the Society, and some of them had given up their Saturday afternoon to be present. It is all the more disappointing, therefore, that the total attendance was only six, including two members of the Entomology Section who are also members of the Society. The members who did take the trouble to attend had an interesting day, which was made rather informal as so few were present.

Before lunch the Society was welcomed by the Head of the Entomology Section, Dr. G. H. L. Dicker, who gave an introduction to the work of the Station as a whole and to that of the Entomology Section in particular. Miss M. Gratwick then told the party of her work on insect rearing and the control of Codling Moth (*Laspeyresia pomonella* (L.)). She demonstrated a number of different techniques for rearing various insects, including *Drosophila* (used in bio-assay work).

The party had lunch in a nearby experimental orchard and, despite the forgetfulness of the leader, washed it down with coffee provided by our hosts. After lunch the Horticultural side of the Station's work was discussed by Mr. B. Self (Scientific Liaison Section) and the stages in producing a commercial apple tree were shown, with a demonstration of "budding". Mr. Self remarked that perhaps the most important past work of the Station had been to produce the Malling and Malling-Merton series of apple rootstocks. The members were then shown the Entomology Section's mercury vapour light trap, which is not sited in a very productive place but which yet catches a number of interesting species, besides the economically-important ones. A short discussion on the use of a light trap in economic work was opened by the leader, who showed a few of the Lepidoptera which had been taken in the trap.

The party then moved to an orchard to hear Dr. A. M. Massee talk on beneficial insects on fruit trees. This was a valuable complement to the paper given before the Society in April by Dr. Massee. He illustrated his talk with set insects which were passed round from person to person. He was followed by Mr. J. B. Briggs, who talked on the Strawberry Seed Beetle (*Harpalus rufipes* (Degeer)). After describing the life-history of this species Mr. Briggs told of his work on it and suggested that damage to strawberries could be lessened by keeping the land 'clean'.

A welcome cup of tea was provided by the Station and a good deal of discussion took place. After the Station's staff had been thanked on behalf of the Society the members dispersed, most of them to catch a train to London.

CHOBHAM COMMON, SURREY—12th September 1959.

Leader: Mr. ROBIN M. MERE.

Nine members and friends attended this meeting. The weather was superb; warm, sunny and cloudless as has been usual this marvellous year, and, as has also been usual, there was a dearth of insects on the wing.

The areas round Gracious Pond Farm and to the south-east of it were worked. One *Colias croceus* Fourc. male was seen and a few lepidopterous larvae were found by beating, searching and sweeping; the most noteworthy being *Bucculatrix cidarella* Zell. on alder and *B. frangulella* Goeze on buckthorn.

Spiders are a group of which comparatively few records appear in reports of field meetings, and it is probably worth while to record in full the species noted by Mr. Norman Hammond: *Clubiona terrestris* West and *Cheiracanthium erraticum* (Walck.) (Clubionidae); *Thomisus onustus* Walck., *Misumena vatia* (Clerck), *Xysticus cristatus* (Clerck) and *Philodromus histrio* (Latr.) (Thomisidae); *Marpissa muscosa* (Clerck) and *Evarcha arcuata* (Clerck) (Salticidae); *Oxyopes heterophthalmus* Latr. (Oxyopidae); *Trochosa terricola* Thor. (Lycosidae); *Pisaura mirabilis* (Clerck) (Pisauridae); *Ero tuberculata* (Deg.) (Mimetidae); *Meta segmentata* (Clerck), *Araneus diadematus* Clerck, *A. quadratus* Clerck, *A. umbraticus* Clerck, *A. redii* (Scop.) and *Zygiella x-notata* (Clerck) (Argiopidae); *Gonatium rubens* (Blackw.), *Helophora insignis* (Blackw.) and *Linyphia triangularis* (Clerck) (Linyphiidae). The capture of *O. heterophthalmus* Latr. is worth special mention; previously it has been recorded from the New Forest, Hants, only, the last time being in 1917.

FARNINGHAM, KENT—20th September 1959.

Leader: Mr. J. M. CHALMERS-HUNT.

A fairly warm, sunny and windless day was enjoyed by the ten people who attended this meeting.

Leaving the railway station, the party set off across fields and through orchards, where larvae of *Grapholita funebrana* Treits. were found in bad plums, to Farningham Wood, where a number of interesting Lepidoptera were noted, including the young larvae of *Pseudoips prasinana* L. (*bicolorana* Fuessl.) on oak, several small cases of *Coleophora fuscocuprella* H.-S. on the undersides of hazel leaves, and larvae of *Swammerdamia pyrella* de Vill. were also found. On the way back to the station a single example of *Heterographis oblitella* Zell. was taken by the side of a field, and is one of the very few occasions that this species has been noted in Kent.

Mr. N. Hammond submitted the following list of spiders taken: *Xysticus cristatus* (Clerck), *Pisaura mirabilis* (Clerck), *Meta segmentata* (Clerck), *Araneus diadematus* Clerck, *A. quadratus* Clerck, *A.*

umbraticus Clerck, *A. redii* (Scop.), *Zygiella atrica* (C. L. Koch) and *Gonatium rubens* (Blackwall).

TILGATE FOREST—27th September 1959.

Leader: Mr. F. T. VALLINS.

A party of seven assembled at Three Bridges station, with the weather promising to be fine and warm, in keeping with the dry and sunny period which had persisted throughout the spring and summer. Furnace Farm, at the entrance to the forest, was reached by car.

It was soon obvious that the hot weather had been detrimental to both plant and animal life, the whole area being very dry and dusty. Butterflies were scarce, the only species seen being *Pararge aegeria* L. and *Lycaena phlaeas* L. Imagines of the moth *Peronea ferrugana* Schiff. were also taken, and pupae and larvae of this species were common in spun leaves of birch. A few larvae of *Peronea hastiana* L. were taken on willow and these produced some nice forms when the moths emerged in October and November. Four fully-fed larvae of *Harpyia* (*Cerura*) *furcula* Clerck were found on a very small bush of willow.

Other lepidopterous larvae beaten from birch and alder were *Drepana falcataria* L., *Cosymbia albipunctata* Hufn. (*pendularia* Clerck auctt. nec Clerck), *Electrophaës corylata* Thunb., *Cabera pusaria* L. (also from willow), *C. exanthemata* Scop., *Campaea margaritata* L., *Biston betularia* L. and *Swammerdamia heroldella* Hübn. Larvae of *Drepana binaria* Hufn. were found on oak and those of *Gracillaria stigmatella* F., on willow.

Fungus was scarce, owing to the drought, which was a great disappointment after the interesting species found on the last visit to this locality. The only species worthy of mention were *Tricholoma rutilans* (Schaeff.) Fr., *Clitocybe aurantiaca* (Wulf.) Studer, *Boletus edulis* (Bull.) Fr., and *Peziza aurantia* Pers. ex Fr.

The pretty little Ivy Campanula, *Wahlenbergia hederacea* (L.) Rehb. was in bloom, and near the station planted bushes of *Elaeagnus angustifolia* L., with an abundance of fruit, were noted.

A female of the large ichneumon fly, *Lampronota setosa* (Geoff.) was taken on the wing and another was seen. This fly is parasitic on the larvae of the goat moth, *Cossus cossus* L., which it reaches by means of its long ovipositor.

An unpremeditated and all too short visit was paid to the nursery of the Forestry Commission, where the party was shown the stock of seedling conifers, beech and oak, amounting to many hundreds of thousands. The handsome leaves of *Quercus maxima* (Marsh) Ashe (*rubra* L. sec Duroi) had previously been noticed, where they had been planted to protect the young conifers.

Although insects had been so few, it was generally agreed that this district holds much promise and more meetings should be held here.

OXSHOTT, SURREY—4th October 1959.

Leader: Dr. J. RAMSBOTTOM, O.B.E., M.A., D.Sc., F.L.S.

In addition to the leader, ten members and four visitors attended. The day was warm and sunny. No rain had fallen for several weeks, so that the Common was parched and conditions were very unfavourable for fungus. By searching in damp spots, which in ordinary times would have been unworkable, no less than 32 species were found. Three of the bolets listed were in fair numbers (*Boletus bovinus* (L.) Fr., *B. variegatus* (Swartz) Fr. and *B. scaber* (Bull) Krombh.), and there were some very fine specimens of the first-named. A pleasing find by one of the lepidopterists, was *Gomphidius roseus* Fr. Other interesting species were *Tricholoma leucophaeatum* Karst., *Inocybe lanuginosa* (Bull) Fr., *Psilocybe ericaea* (Pers.) Fr., *Ps. uda* (Pers.) Fr. and *Ps. polytrichi* Fr.

The leader showed and explained the mycorrhiza on the roots of Scots Pine and birch. He drew attention to the many species of micro-fungi growing on bracken stems, tree stumps, leaves and on the larger fungi.

The lepidopterists devoted their attention to the smaller species and apart from larvae of *Macrothylacia rubi* L. their reports deal only with the so-called micros. There was an unusually good crop of Spanish chestnuts, and many members of the public were gathering them. It was noted that the larvae of *Laspeyresia splendana* Hübn. were common in the fruits. Imagines of *Lyonetia clerkella* L. were flying. Mined leaves of Mountain Ash were collected for *Lithocolletis sorbi* Frey and those of alder for *L. alnifoliella* Dup. Larvae of *Coleophora albicornuella* Bradley (*paripennella* auct. nec Zell.) and of *C. milvipennis* Zell. were taken. As regards the former see 1956, *Ent. Gaz.*, 7: 145.

Mr. N. Hammond reported the following spiders: *Xysticus cristatus* (Clerck), *Argyroneta aquatica* (Clerck), *Meta segmentata* (Clerck), *Araneus diadematus* Clerck, *Gnatharium dentatum* (Wid.), *Savignia frontata* Blackw., *Linyphia triangularis* (Clerck). These are all common species; the only unusual feature was that *Argyroneta aquatica* (the well-known water spider) was taken not from the water but from the sphagnum moss on the edge of the black pond on Esher Common.

List of fungi: *Amanita rubescens* (Pers.) Fr., *Tricholoma leucophaeatum* Karst., *Laccaria laccata* (Scop.) Cke., *L. amethystina* (Vaill.) Cke., *Mycena alcalina* Fr., *Collybia radicata* (Rehl.) Fr., *Pleurotus ostreatus* (Jacq.) Fr., *Lactarius plumbeus* Fr. (= *turpis* Fr.), *L. uvidus* Fr., *L. glycyosmus* Fr., *Russula cyanoxantha* (Schaeff.) Fr., *R. emetica* (Schaeff.) Fr., *R. ochroleuca* Fr., *Naucoria escharoides* Fr., *Inocybe lanuginosa* (Bull.) Fr., *Paxillus involutus* (Batsch.) Fr., *Stropharia semiglobata* (Batsch.) Fr., *Hypholoma fasciculare* (Huds.) Fr., *H. con dolleanum* Fr., *Psilocybe ericaea* (Pers.) Fr., *Ps. uda* (Pers.) Fr., *Ps. polytrichi* Fr., *Gomphidius roseus* Fr., *Boletus bovinus* (L.) Fr., *B. variegatus* (Swartz) Fr., *Boletus piperatus* (L.) Fr., *B. scaber* (Bull.) Krombh., *Polyporus betulinus* Fr., *Trametes gibbosa* Fr., *Merulius tremellosus* Schrad., *Thelephora laciniata* Pers. (= *terrestris* Pers.) and *Scleroderma vulgare* Hornem. (= *aurantium* Pers.).

BOX HILL, SURREY—10th October 1959.

Leader: Mr. T. R. EAGLES.

Six members and one visitor attended. It was raining as the party set off along the bank of the Mole, starting near where the river runs under the main road and working towards the Stepping Stones. They sheltered from time to time hoping the rain would stop and this gave an opportunity to admire the many fine trees growing here. Among others there were *Populus alba* L. (White Poplar), *P. canescens* Smith (Grey Poplar), *Acer pseudoplatanus* L. var. *purpureum* Loud. (the variety of the sycamore with leaves purple on the underside), *Acer plantanoides* L. (Norway Maple), *Salix babylonica* L. (Weeping Willow). In addition to typical trees of the last named there was a form with the leaves twisted into rings. This is var. *annularis* Asch.

In the leaves of the White Poplar were mines of *Lithocolletis com-parella* Zell. but no moths were obtained as many of the larvae had been parasitized and the rest had pupated and the moths had emerged. There is a very fine beech tree in the middle of the field and in its leaves were the empty larval mines of *Ornix fagivora* Staint. Several broods of *Lithocolletis faginella* Zell. had caused serious damage to beech leaves. Seeds of sycamore were collected and larvae of *Pammene regiana* Zell. were found to be present. Larvae of *Coleophora erigerella* Ford were taken in the seed heads of *Erigeron acris* L. (Blue Fleabane). The leaves of *Sorbus aria* (L.) Crantz (White Beam) were mined by larvae of *Lithocolletis corylifoliella* Haw. and those of *Crataegus monogyna* Jacq. (Hawthorn) by *L. oxyacanthae* Freyer. Other larvae noted were *Ornix avellanella* Staint., *Lithocolletis nicelli* Staint., *Bucculatrix frangulella* Goeze, *Nepticula catharticella* Staint., *N. gratiosella* Zell., *N. marginicolella* Staint., *N. floslactella* Haw., *N. ignobilella* Staint., *Coleophora badiipennella* Dup. and *Antispila treitschkiella* F.R.

As there seemed no prospect of the rain stopping the party decided to make for the station early in the afternoon.

THE MALAYAN GLIDING REPTILES

By M. W. F. TWEEDIE.

Read 12th February 1959.

The climate of the Malay Peninsula, with its high temperature, high rainfall and humidity, and absence of any well-marked seasons, is eminently suited for the development of rain forest. The dominant feature of this type of vegetation is tall trees standing close together, their tops interlacing to form a continuous 'canopy', their branches heavily beset with epiphytes and creepers, the ground beneath them perpetually shaded. In its primaeval condition, Malaya may be supposed to have had an almost uninterrupted cover of rain forest, since none of its mountains are high enough to approach the equatorial tree line.

Wherever rain forest is developed a great wealth of arboreal animal life is associated with it. Of the vertebrates a host of birds and a few bats are the only ones that can fly. Almost all the rest merely scramble about in the branches as best they may, but a few, lacking the power of sustained flight (which in a vertebrate always involves the complete sacrifice of one pair of limbs) have acquired a capacity for air-born progression that is intermediate between leaping and flying. These are the gliders; to 'fly' they must attain altitude by climbing, spread some sort of parachute-like surface and then dive into space. Most of them can travel by this means a horizontal distance in excess of the height that is lost as they glide, in other words they can glide at an angle flatter than forty-five degrees, some being more efficient in this respect than others. All can steer themselves accurately in the air to land on a selected branch or on the trunk of another chosen tree. With few exceptions they come only reluctantly to the ground, and so they can be at home only in forest so dense that the trees stand at least as close as their average height. It is easy to see that the rain forest environment is likely to be effective in promoting adaptation of this kind, and the zoological subregion of Malaysia (Malaya and the East Indian islands west of Wallace's Line) is particularly rich in examples of it.

Among the mammals a similar type of parachute has been evolved independently several times. It is seen in the different genera of Flying Squirrels, in the so-called Flying Lemur (*Cynocephalus*) and (in the Australian Region) in the marsupial Flying Phalangers. Here it consists of a fold or web of skin on each side of the body, extending from wrist to ankle, which is stretched taut when the animal spreads its limbs out on each side. On the other hand, among the gliding reptiles an interesting variety of morphological permutations is found.

Most highly modified, most efficient and surely the most attractive of them are the wonderful little lizards of the genus *Draco*, the Flying Dragons of the older text-books. These have the hinder five, six or

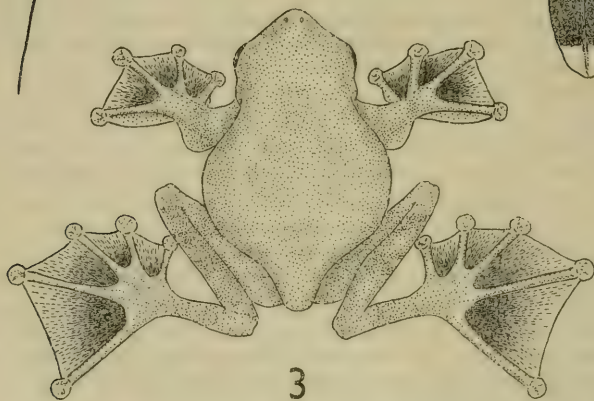
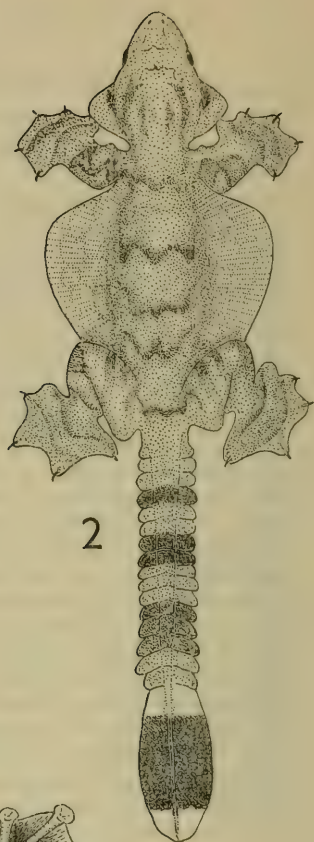


Fig. 1.—Common Flying Lizard, *Draco volans* L., with the parachute membrane extended. Fig. 2.—Kuhl's Flying Gecko, *Ptychozoon kuhli* Stejn., with the parachute membrane extended. Fig. 3.—Wallace's Flying Frog, *Rhacophorus nigropalmatus* Blgr., it is not claimed that the attitude of "flight" is accurately shown.

seven pairs of ribs extending, in the form of cartilaginous rods, outside the body, and supporting a membrane of skin (fig. 1). The ribs are horizontally hinged at their bases and the whole apparatus can be folded up like a fan and laid along the sides, when it is scarcely visible and no encumbrance to the lizard when it is running or climbing (Pl. VI, fig. 1).

The parachute is clearly an adaptation for gliding, but may be half opened when two of them are courting, chasing or sparring with each other. It is also fully spread in an aposematic display, particularly in relation to snakes, which are probably the most serious predatory enemies of these lizards. A captive *Draco* will invariably spread its patagium and stand rigid if a snake, held in the hand, is brought near to it.

In flight these little reptiles are graceful and buoyant, and glide at quite a small angle from the horizontal. The 'wings' are brightly coloured, those of the common *D. volans* L. being blue below in the male and blackish spotted with orange above. The first one I saw in flight I quite genuinely mistook for a butterfly and was most startled when it landed on a tree and was transformed to a drab, skinny little lizard.

All of them possess a scaly pouch on the throat with a smaller 'wattle' on each side of it. Rods of cartilage (branches of the hyoid bone) project into these, and by means of the centre rod the pouch can be flicked backwards and forwards in what is usually regarded as a courtship display. In *D. volans* it is yellow in the male, bluish and smaller in the female. I have often seen males flicking the pouch in and out when there was apparently no other lizard present, and I believed that, as well as providing a courtship display, it serves as a signal to advertise his presence to any other member of the species that may be in the vicinity, to find a mate, that is to say, as well as to woo her. It is very conspicuous and has frequently betrayed to me the presence of a lizard that otherwise I should certainly not have seen. In most discussion of the theory of natural selection great stress is laid on the idea of the struggle for existence and the survival of the fittest, and less on the fact that an animal must not only survive but must beget or bear offspring if it is to contribute to its species' future. Selection will operate hardly less powerfully in favour of characters promoting sexual success than of those which secure individual survival. When survival depends upon concealment such adaptations are likely to conflict with each other, and a balance will be maintained between them.

Flying Lizards come voluntarily to the ground for one purpose only, that of depositing their eggs in mould at the base of a tree.

Eleven species of *Draco* are recorded from the Malay Peninsula. In the south part of it, at any rate, all but one are jungle lizards, never found outside their primitive habitat. *Draco volans*, however, one of the smallest of them, takes kindly to the sort of open park-like vegetation which is fostered or tolerated by man in those parts of his artificial

environment in which anything is allowed to grow at all. Rubber and coconut estates are specially favoured by this lizard, the spacing of the trees seems well suited to its capacity for flight. It is common, too, in gardens and I have often seen it on roadside trees in Singapore, even well within the city limits.

It is possible that it has some robust versatility of temperament which has enabled it to colonize where its congeners have remained conservative. More likely, I think, it has always had a preference for open country, the coastal fringe, perhaps, or those infrequent areas where the soil is naturally so poor that even the exuberance of the rain forest is curtailed. If this is so, *volans* was probably comparatively rare in primaeval Malaya. If its appearance of being now the most abundant species is illusory, due to the inaccessibility of the others' habitat, this illusion, with the continual destruction of primary forest, is rapidly being translated into reality; possibly this species will survive after all the others are extinct.

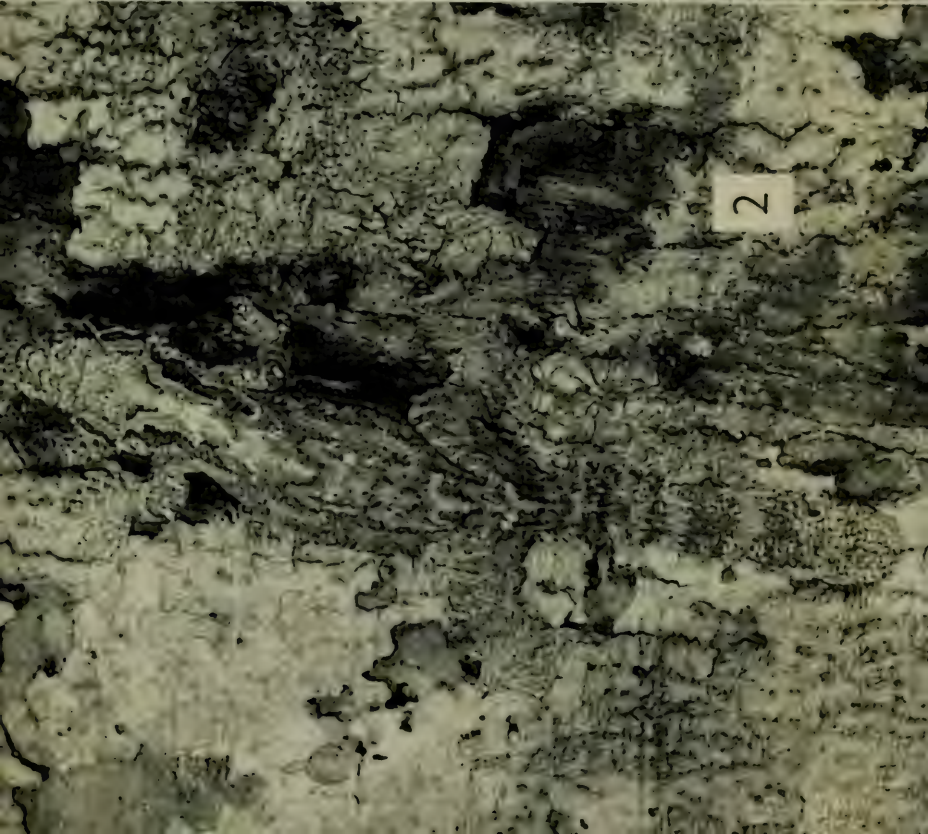
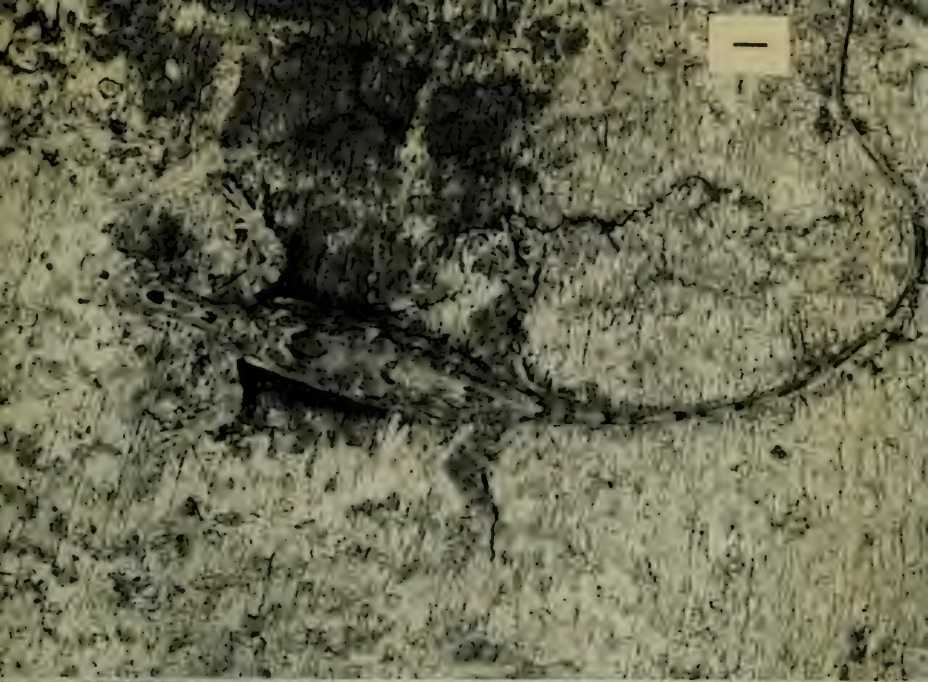
Here, perhaps, is a modern and synthetic version of a story far older than most of the hills. Ever since life began these skirmishers outside and around the environment of the dominant fauna have proved to be evolution's chosen people. The first vertebrates to colonize the land could be described in these terms, and in the Mesozoic the mammals probably bore this relation to the reptiles.

The Flying Dragons belong to the family Agamidae. The only other lizards which are adapted in a similar way belong to the genus *Ptychozoon*, members of a totally different group, the Geckos; their ability to glide was positively demonstrated so recently as 1949 (Tweedie, 1950). Of the two Malayan species Kuhl's Flying Gecko, *Ptychozoon kuhli* Stejn. is the more common. Its gliding mechanism, when compared with that of *Draco*, affords an interesting example of how evolution can attain the same object in two quite different ways. On each flank of the gecko there is an outgrowth of rather thick skin, stiffened with fibrous tissue, strongly near the line of union with the body, distally progressively less so. It is not under any sort of muscular control and, when not in use, lies curled round the body, the two flaps not quite meeting in the mid-ventral line. From below it looks a little as if the lizard were wearing a waistcoat, fitted in its younger and slimmer days, and no longer susceptible of being buttoned up. On each side of the head is a smaller outgrowth of skin similarly disposed. The tail has a scalloped fringe of skin on each side, permanently extended, and the fingers and toes are broadly webbed (Pl. VII, fig. 1).

When *Ptychozoon* takes to the air he starts with a sort of swallow dive. As he accelerates the pressure of the air on his underneath forces open the two flaps of skin so that they project on each side. The

PLATE VI.

Fig. 1.—Common Flying Lizard, *Draco volans* L. Fig. 2.—Kuhl's Flying Gecko, *Ptychozoon kuhli* Stejn. Both on the bark of a tree.



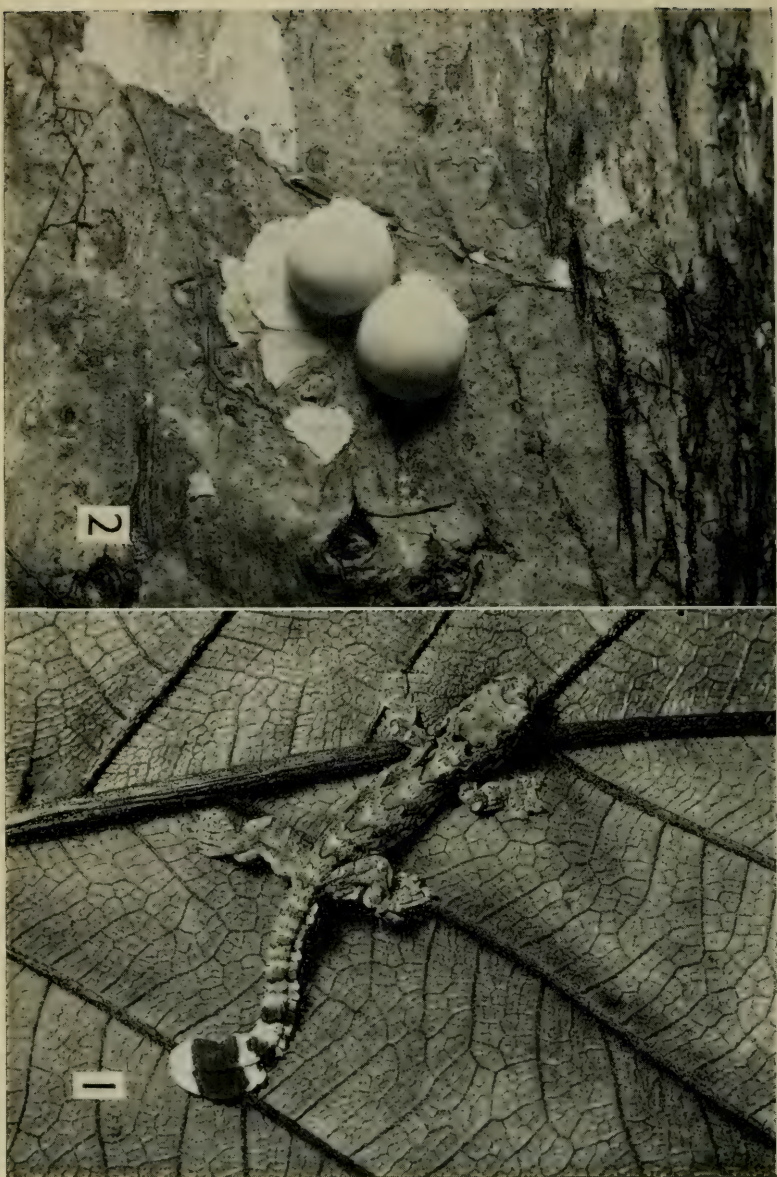


Fig. 1.—Newly hatched young of Kuhl's Flying Gecko, *Ptychozoon kuhli* Stejn. Fig. 2.—Eggs of the same animal.

degree and distribution of their stiffening is such that, under the falling lizard's weight, the air pressure and their own natural tendency to downward curvature are balanced when they lie in the horizontal plane of the body. These, together with the flaps on the head, the outstretched webbed feet and the frilled tail (fig. 2), enable the lizard to glide at an angle a little flatter than forty-five degrees (Tweedie, 1954). It is a larger, more heavily built animal than *Draco*, and its total spread of air-resisting surface, although so diversely constituted, is considerably less, relative to its weight. It is accordingly much less buoyant in the air.

The photograph (Pl. VI, fig. 2) shows how wonderfully well Kuhl's Flying Gecko is concealed when it lies motionless and flattened against the bark of a tree; another point of interest is seen in this picture. Inspection of the tail shows that only the proximal part is scalloped in the normal way, distally the edges are entire. All geckos part readily with their tails in an emergency and grow a new one, which is, however, a mere cartilaginous rod, quite different in structure from the flesh-covered series of vertebrae which constituted the original appendage. Here, clearly, is a case of tail regeneration in *Ptychozoon*. As each of the lobes on the scalloped fringe of the original tail corresponds to a vertebra, these will not be reproduced in the regenerated part. It is necessary, however, for the flattened shape of the tail to be preserved, to maintain its function, and so, instead of the tapering secondary cartilaginous tail of the ordinary gecko, *Ptychozoon* grows a laminar one, its edges being entire because it is not segmented. The specimen photograph in ventral view (Pl. VIII, fig. 1) has its original tail intact.

The eggs of *Ptychozoon* are most curious. They are always laid in pairs (a general habit among geckos) and have the form of hemispheres glued by their flat sides to the bark of a tree. Unlike *Draco*, *Ptychozoon* need never come to the ground. The pair of eggs illustrated (Pl. VII, fig. 2), which was found on a tree under a mass of epiphytic orchids, shows an additional interesting feature. It can be clearly seen that one of them partly overlies a circle of shell representing another egg, which has hatched and of which only the adherent part remains. This circle overlies, in turn, yet another. It seems unlikely that several individuals should resort to this one spot in an area of dense forest offering innumerable sites suitable for geckonid oviposition. The most acceptable explanation is that the female returns to the place where she has previously laid.

These two eggs hatched sixty-seven and sixty-eight days after they were found, and a pair laid in captivity are recorded as having hatched seventy-three days later (Tweedie, 1954). If the female does return to the same place to lay at intervals of over two months, she must be credited with a remarkably retentive memory and well developed sense of location, unless it is supposed that she inhabits, more or less permanently, a restricted territory with which she becomes intimately familiar. I incline to this explanation and believe that one of these

geckos may live perhaps for the whole of its life among the branches of one large tree.

There are several species of arboreal Colubrid snakes which have the power of falling in a controlled glide, though they achieve nothing approaching the floating swoop of *Draco* and are probably less efficient than *Ptychozoon*. No special supporting surfaces are developed, and buoyancy is obtained by flattening the body and hollowing its under surface, so that a cushion of air is trapped, just as it is under the inverted bowl of the fabric of a falling parachute.

The genus on which most observations have been made is *Chrysopelea*, and the most circumstantial account published is that given by Shelford (1906), who describes one as gliding from his hands, straightening itself out, hollowing the ventral surface and falling not in a direct line to the ground but at an angle. Shelford's experiments were prompted by accounts given by Dayaks of these snakes, and of another, a species of *Ahaetulla*, gliding through the air from trees. Since that time there has been published a number of accounts by reliable eye-witnesses of this performance by *Chrysopelea*.

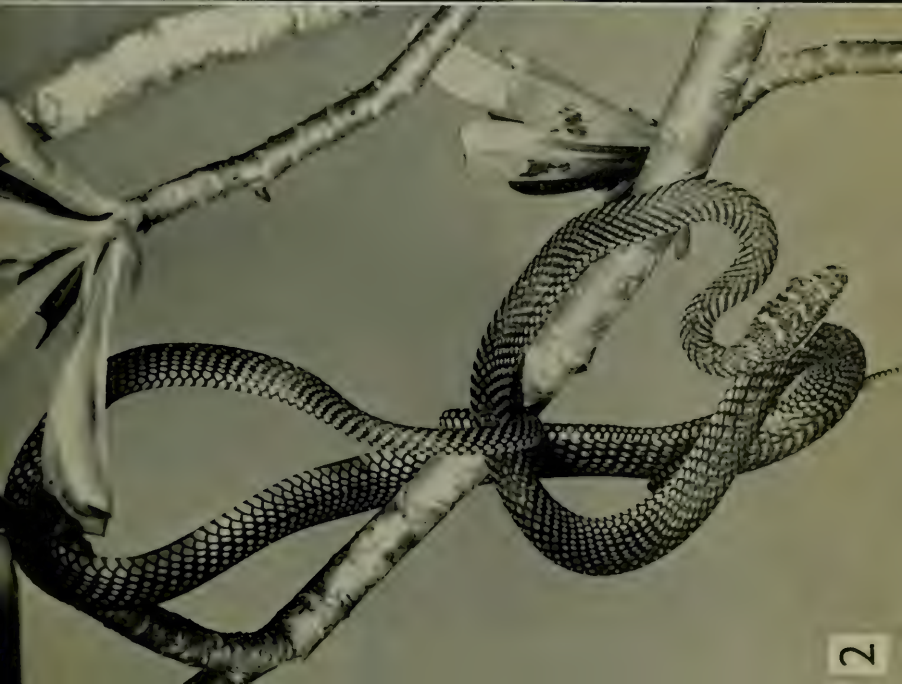
These snakes are less strictly arboreal than the gliding lizards, but their capacity for climbing is nevertheless astonishing. A *Chrysopelea* can glide quite rapidly up the vertical trunk of a large tree if the bark is fairly rough, and among the branches it will leap and scramble about almost as actively as a squirrel. I have encountered them on the ground more than once, and on one occasion swimming a river on which I was travelling by boat. Of all the reptiles of which I have experience of the living animal I account *Chrysopelea* the most versatile athlete, a surprising victor *ludorum* without arms or legs. The species figured (Pl. VIII, fig. 2) is *Chrysopelea paradisi* Boie.

The account by A. R. Wallace in his book *The Malay Archipelago* of the Flying Frog of Borneo has been very generally treated with scepticism. Since the species referred to, *Rhacophorus nigropalmatus* Boulenger, occurs also in Malaya, and since I regard Wallace's account as not merely credible but convincing, I propose to present the case for regarding this frog as a glider. Recorded observations since that of Wallace have contributed so little to the problem of the Flying Frog that I shall confine myself to his story and to the evidence to be deduced from our knowledge of the nature and habits of the animal.

The frogs of the genus *Rhacophorus* are arboreal, spending their time among the branches and foliage of trees and other vegetation; they do not enter the water even to breed. Those species whose breeding habits are known lay the eggs in masses of froth over water and they are washed down into it by rain, the tadpoles being aquatic as in normal batrachians. These tree frogs are, therefore, not habitually swimmers. *R. nigro-*

PLATE VIII.

Fig. 1.—Kuhl's Flying Gecko, *Ptychozoon kuhli* Stejn., photographed through a pane of glass to which it is clinging. Fig. 2.—Paradise Tree Snake, *Chrysopelea paradisi* Boie.



palmatus (fig. 3) is well described by Wallace (I have seen a dead specimen) as having 'the toes very long and fully webbed to their very extremity, so that when expanded they offered a surface much larger than the body. The fore legs were also bordered by a membrane and the body was capable of considerable inflation'. This combination of characters in a member of a genus of arboreal, non-aquatic frogs, the normal members of which are well known to be extremely active leapers seem to me to be susceptible of only one reasonable explanation: that they serve to give the animal buoyancy in the air. Other batrachians are known to have the habit of inflating themselves with air, usually in the presence of a predatory enemy, such as a snake; the performance is probably aposematic. Since the apparatus for doing this is generally developed in frogs and toads, it may well be resorted to, to give additional buoyancy, by species that glide or make extensive aerial leaps.

Wallace's specimen was brought to him by 'one of the Chinese workmen', who 'assured him that he had seen it come down in a slanting direction, from a high tree, as if it flew'. This story has almost universally been regarded as an unreliable testimony, but I regard this scepticism as ill considered. In the first place, a story about a frog fabricated by a Chinese workman of the mid-19th century would most probably be more colourful and less in harmony with the laws of Nature than the one reported by Wallace. Secondly, such a story as this would almost certainly not be fabricated at all except as an attempt to support an interpretation of the peculiar features of the frog's morphology. To attribute such a motive to the Chinese workman is, I think, quite inadmissible. We are left with the alternatives of accepting the man's story as it was told or of impugning the integrity of Wallace himself; I prefer the former one.

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A NATURALIST IN THE KINGDOM OF KERRY

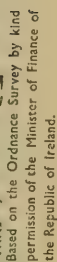
By H. C. HUGGINS, F.R.E.S.

Read 13th August 1959

I am using the title of the Kingdom of Kerry as it is a convenient term to include the county of Kerry and all that mountainous part of West Cork which geographically belongs to it. This division roughly corresponds to the old Irish Kingdom of Kerry, as the late Philip Graves pointed out to me, and older writers frequently used it; Kane constantly alludes to Dursey and Glengarriff as in Kerry.

This area is largely rocky and mountainous, being mostly old red sandstone, and the land is usually more or less peaty bog. Originally no doubt it all had a superficial covering of limestone, but in many places this is totally denuded, and sour acid bogland alone is left. Many of the valleys and lower slopes are extensively wooded. The predominant tree is birch, with a large admixture of oak, alder and willow. As, however, all the demesnes have been extensively planted at some period, such trees as beech, several sorts of fir, and elm turn up in many places. The agriculture is necessarily still somewhat primitive, potatoes and hay in rather small fields being the general order, together with cattle and sheep on the unenclosed parts. The breeds of these have changed in the past 50 years; the sheep are now largely black-faced instead of the long-horned Kerry type, which is an improvement, but the small black Kerry cow has given place to various nondescripts by no means so well suited to the country. Pigs are chiefly Large Whites. Graves, who was born at Sneem, Co. Kerry, told me that in his boyhood he often saw the Irish Greyhound Pig, but this had disappeared when I first visited Ireland nearly 50 years ago. It was by his description a fearsome-looking beast, very large, lean and razor-backed, standing on legs double the length of those of to-day's breeds.

The fauna and flora of this part of Ireland includes a number of Lusitanian species, to-day otherwise commonest on the southern shores of the Bay of Biscay and in the Pyrenees. The localities shared by these species deserve to be emphasised, as even the most eminent authorities seem rather confused about them. Ford, E. B. (1955, *Moths*, p. 162, London) gives four examples of Mediterranean species found in Ireland—leaving aside the Mediterranean Heath, which according to Acton was introduced in 1648, though the point has been disputed—two of the remaining three, "London Pride" and the slug *Geomalacus maculosus* Allman, are found nowhere nearer the Mediterranean than north-west Spain and are ecologically totally unsuited to the Mediterranean region. I shall return to these two interesting species later. The three Hadeninae, *Hadena barrettii*



KINGDOM OF
KERRY

Doubl., *H. caesia* Schiff. and *H. lepida* Esp. ssp. *capsophila* Dup., all have forms in Kerry agreeing with Pyrenean forms, and in the case of *H. barrettii* and *H. capsophila*, differing from those found at Howth, Co. Dublin.

Kerry plants of especial interest include the Strawberry Tree (*Arbutus unedo* L.), otherwise found in Ireland only at Lough Gill, and two butterworts. Of these the superb Great Butterwort (*Pinguicula grandiflora* L.) grows on most of the bogs, it has flowers like a very large violet, on stalks six inches high. The Pale Butterwort (*P. lusitanica* L.), unlike its more handsome relative which is confined to West Cork and Kerry, is also found locally in south-west England and western Scotland, it has small pale lilac flowers and grows chiefly in cracks in the rocks. Both species have a rosette of pale green, oily looking leaves, and tiny thread-like roots, which have little grip on either bog or rock. The leaves are viscid and insects are frequently found adhering to them, the plants are usually characterized as partially living on organic matter, like the Droseraceae (Sundews), but I have never heard of any experiments having been made to prove this. The butterworts grow from sea level to at least 1,200 feet, the Blue-eyed Grass (*Sisyrinchium angustifolium* Mill. sec Fernald) seems to prefer the higher levels and I have only found it at over 600 feet; it is particularly common at Windygap.

There are two saxifrages in the district of more than usual interest, both Lusitanian species. Of these the Kidney Saxifrage (*Saxifraga hirsuta* L.) is entirely confined to this district in the British Isles and is otherwise found only in north-west Spain. The other one is the plant alluded to by many writers as "London Pride". It is, however, a different plant from the London Pride beloved of suburban gardeners and celebrated in a little song by Mr. Noel Coward, which is a nursery hybrid between it and the non-British *S. umbrosa* L., and is usually known to-day as the Kerry Saxifrage, though anyone who feels all "Colleenbawnish" may call it St. Patrick's Cabbage. It looks exceedingly handsome growing freely in cracks in the rocks—abroad it is confined to the mountains of north Portugal and north-west Spain. Hybrids between the Kerry Saxifrage (*S. spathularis* Brot.) and *S. hirsuta* L. are common in the wild.

The molluscs of the district are of great interest. *Helix nemoralis* L., besides being very varied, is unusually attractive in many places because of the thinness of the shell due to the entire absence of lime. On the rocks in the acid bogs the shell is almost membranaceous. The same factor is the cause of the extreme forms developed by *Limnaea pereger* Mull. in some of the mountain lakes of the district. Several of these were formerly elevated to specific rank, such as *L. involuta* Thompson and *L. praetenuis* Bowell. *L. involuta* was supposed to be confined to Lough Crincaum, Killarney, and its diagnostic was the intorted spire of the shell. My late friend R. A. Phillips, however, found it in Barley Lake, Glengarriff, and I subsequently did so in several lakes in the Caha Plateau near Glengarriff, notably Loughs

Nambrack and Toberavanaha. A survey of these mountain tarns from 1914-1918 convinced me that all these isolated forms were simply environmental races of *L. pereger*, as I stated in a paper in the *Irish Naturalist*, 27: 119-128. The conclusions at which I arrived had a mixed reception at the time but were entirely confirmed some ten years later by Prof. A. E. Boycott, F.R.S., by dissections and breeding experiments.

The slugs include the very local *Limax cinereo-niger* Wolf, our largest native species, which is found in several ancient woodlands; and extraordinary forms of the black *Arion ater* L., which range from pure white through yellow, red, and leaden, to black; and also includes curious combinations such as white with a black saddle and buff with a chocolate saddle.

The most celebrated mollusc of all, however, is the famous Kerry Slug (*Geomalacus maculosus* Allman). This is found almost throughout the area; I have seen it at 1,000 feet above sea level on the rocks in a sour bog, and climbing on trees below sea level in the demesne at Glengarriff, whilst the most beautiful specimen I ever found, in ground colour like a ripe banana, was crawling over a bed of Thyme on the top of a cliff at Dursey, within ten yards of the sea. It is found in several forms, all black with small yellow markings (form *allmani* Heynemann), all yellow with black spots (form *verkruzeni* Heynemann) and with several longitudinal stripes (form *fasciata* Cockerell). The last is probably a vestigial form, as the young mollusc is striped; the other two environmental, *allmani* living on black rocks in the bogs and *verkruzeni* in the woods at sea level. The requirements of this slug for survival are an almost constant rainfall and absence of frost, its only other known habitats are north-west Spain and Portugal. Given these it is not fussy, in nature it lives on lichens and liverworts, but specimens I sent to the late Charles Oldham in 1919 lived comfortably on damp oatmeal in a vivarium, and bred; one of the progeny which he reared from the egg living between three and four years.

There are few mammals of interest, the common and grey seals both occur, and formerly the pine marten was generally distributed. It has, however, been exterminated everywhere now except on the Kenmare estate at Killarney, where also live the only surviving Irish red deer. These, I am told, are larger than the Scottish animals.

Of the birds the most interesting seem to me the gannet and the chough. These two birds are still on the increase. The principal gannet colony is on the Little Skellig, which is plainly visible on a fine day from either Dursey or Kenmare Head. The two islands, Great and Little Skellig, are to be seen in June apparently floating in the water like great galleons, but Great Skellig is entirely green and Little Skellig white. The white colour of the latter is the gannets, with which the island is packed (Fisher and Ververs estimated the colony at 9,500 pairs in 1939), yet although this rock is over full not one will go to the Great Skellig, and the overflow is increasing the colony on The Bull, 20 miles away. The chough is now steadily on the increase, whereas

40 years ago it was a rare bird; I saw flocks of 30 or more in 1950 and 1952.

I have not done a great amount of work with the beetles but the pretty and local *Carabus nitens* L. is found on many of the bogs, and I found the local and scarce *Strangalia aurulenta* F. not uncommon at Glengarriff. I was able to collect a series for the British Museum (Nat. Hist.), where there were no British specimens, in 1952. It is fond of the flowers of purple loose-strife and ragwort, but most of mine were taken on an oak stump on the side of the Kenmare road.

To turn to the Lepidoptera, *Leptidea sinapis* L. s.sp. *juvernica* Williams is to be found at Killarney, both at Muckcross and on the Manger-ton road, and *Gonepteryx rhamni* L. s.sp. *gravesi* Huggins is in the same district a month later. *Euphydryas aurinia* Rott. is generally distributed but patchy, it has a habit of disappearing for years from a locality after being common there. From 1914 to 1919 it was common all round Glengarriff, in 1948 Graves told me it had quite gone from there, but I found one or two small localities in 1950 and by 1952 it was spreading again. Contrary to the general opinion, the form *praeclara* Kane is not common in Kerry, the commonest being *scotica* Robson. *Maniola jurtina* L. s.sp. *iernes* Graves is very common. Unfortunately collectors, especially professionals, have created a false impression of this insect by picking out the extreme forms, which writers not conversant with the butterfly have taken as the usual run. The subspecific difference is in the underside, the upperside presents endless variations in markings from the usual English form to the brilliant *hispulla*-like insect, usually called *iernes*.

Coenonympha tullia Müll. is found on most mosses up to 1,200 feet, and varies very greatly, both on the upper and undersides, whilst *C. pamphilus* L. is rare but oddly enough goes higher up the mountains than *C. tullia*. *Aphantopus hyperantus* L. presents one feature of interest, on the low ground it is very like the usual British form, but on the hillside over 600 feet it begins to be replaced by a dwarf form, which at 1,000 feet is the only one. When I first found this dwarf, much worn, on the edge of a mountain bog in early July, I thought I had hit upon *Erebia epiphron* Knoch.

The Kerry *Eumenis semele* L. varies greatly, many being suffused with warm reddish brown, and others very large, most grass feeders tend to run large in Kerry, possibly because of the open winters and quality of the grass.

The last butterfly I shall mention is *Celastrina argiolus* L. Ford (1945, *Butterflies*, p. 285, London) says there is a real distinction between the English and Irish races, inasmuch as the latter has no second brood, even in the extreme south of the country, but it would not be practical to treat them as subspecies because they are not visibly separable. However, throughout Kerry the second brood is frequently very large; in 1950 and 1952 I saw it at Goleen, Glengarriff, Kenmare and Killarney, and at Glengarriff and Killarney it was the commonest

butterfly except for *Maniola jurtina* L. It is exactly the same in appearance as the English second brood.

It is impossible in the time allotted to me to deal adequately with the moths, but I will touch on those I think of the greatest interest. I have never been lucky enough to find *Leucodonta bicoloria* Schiff. and much regret I did not look for it seriously before 1948. The logic of the records, both published and communicated to me privately, suggests that it is becoming increasingly rare, though I have little doubt it will be taken again. From 1859 to 1917 the perfect insect was taken at intervals in the Killarney and Kenmare districts, usually sitting on tree trunks, though the last taken of these, by Bonaparte Wyse at Tore, was beaten out of ivy on the side of the road and flew to a holly bush. Such a capture would be most unlikely to-day because of the stream of cars and buses using the road. From 1932 to 1936 Donovan beat 22 larvae, but only one in 1936. Since then it has not been taken, although Kettlewell, Beirne, Baynes, Wright and myself worked hard at intervals between 1947 and 1954, searching for the moth and larva, larva beating, and with petrol and mercury vapour light, Baynes and Wright actually trying mercury vapour light in Donovan's best locality.

The local *Lasiocampa quercus* L. is the s.sp. *callunae* Palmer. It is found from sea level to at least 1,000 ft. and eats whatever of its foods is commonest, from bramble to bog myrtle and finally heather; it has a one-year cycle.

Bena fagana F. (*prasinana* L. auct. nec L.) is not like the usual British form: the males have very obscure white bands on the forewings and deep golden hindwings. *Lithosia quadra* L. is endemic and common, as it is in the Burren and the Isles of Scilly, and not a temporary settler as in most parts of England. It shows no local variation so is probably reinforced from abroad at times. Another species, usually a short dated settler, that is endemic in Kerry and the Isles of Scilly, is *Nycterosia* (*Nyctosia*) *obstipata* F.

Polia nebulosa Hufn. is a most beautiful insect in southern Ireland, being the white ab. *pallida* Tutt, it looks very pretty when feeding on bramble blossom at night. *Leucania pudorina* Schiff. is not uncommon at Killarney and Glengarriff and Mr. Riley also found several at Ballylicky. I mention this as Donovan was very doubtful of the authenticity of Irish records. *Heliophobus anceps* Schiff. (*saponariae* Borkh.) appears to be rather scarce but generally distributed; it is of the handsome continental form with deep purple brown forewings and bright contrasting veining.

Eustrotia uncula Clerck and *E. olivana* Schiff. are locally common, particularly in clearings in the woods at Killarney and Glengarriff, though in the Caha plateau they may be taken up to 1,500 ft. The Irish *olivana* is slightly larger and duller in colour than the Cambridge form. These two species are accompanied by *Euclidimera mi* Clerck, which should be carefully captured, as its light markings are nearly white, not yellowish as in Britain.

Sterrrha muricata Hufn. is very local, but is found at Cloonee near Kenmare and also throughout the Coomerkane and Oowenacahena valleys at Glengarriff, where in one or two places it is common. I have seen 50 in an hour in a small space, flying in the afternoon sun. Donovan seems very doubtful of the authenticity of the record of the Lancashire form at Clonbrock but at Glengarriff it ranges from rather paler than Cambridge specimens to the full Witherslack coloration. Donovan's record of *Dysstroma concinnata* Steph. from the Kerry mountains is erroneous. The mountain form, which occurs at as low a height as 600 ft. although it is commoner perhaps at places like Windygap, over 1,000 ft. above sea level, is only *D. truncata* Hufn., so the subspecific name of *oressigena* Donovan falls. Baynes has bred this insect under normal conditions and it immediately becomes double brooded, it is quite unlike the Arran insect.

Euphyia bilineata L. is most interesting and aggravating. On many bogs and rocky cliffs it is perfectly normal and then a patch of bog or cliff may be reached where the brown suffused form *testaceolata* Staud. occurs; in extreme cases looking almost like *Calocalpe undulata* L. In the same way sea cliffs by the dozen may be searched and only yellow moths seen, even in the most break-neck clefts, and then a patch may be struck with a small percentage of ab. *hibernica* Prout. It was in such a place that my wife took the beautiful form I have named ab. *ethelae*. I can find no reason whatever for the patchy distribution of these aberrations. The highlight of Irish *bilineata* was the aberration found by Kane on the Tearaght, the last of the Blaskets, and named by him ab. *isolata*. This was uniform dark brown in colour and the only kind found on the rock, whereas the other rare forms found on the coast form only a small percentage of the moths seen. It was, however, exterminated there by a storm which washed away all the vegetation on which it fed. I have a specimen, given by Kane to my old friend B. A. Bower. After his death it passed through several hands and then found a place in the collection of my friend Douglas Smart, at the sale of whose collection it was purchased by Mr. H. D. Bessemer, and then secured by me at the sale of his Geometridae. It is now earmarked for the Rothschild-Cockayne-Kettlewell collection.

The Kerry form of *Eupithecia pulchellata* Steph. is the s.sp. *hebodium* of Sheldon, with practically no red on its forewings. It is rather curious what a wash-up of races seems to occur in Kerry; *pulchellata* and the bird, the Stonechat, are of the Hebridean form, whilst others, as I have already said, are Lusitanian.

The demesne at Glengarriff is the only place in which *Pseudoboarmia punctinalis* Scop. has been found in Ireland, and it was here that I first took *Ectropis bistortata* Goeze, said by Kane and Donovan not to be found in Ireland, although Cockayne afterwards found some specimens in a collection made at Killarney. *Alcis (Cleora) repandata* L. is a very lovely insect in Kerry, the ground colour being often a clear dove grey. However, in five years it fades to a muddy brown which

is heartbreaking to look at. The Kerry form of the allied *Cleora cinctaria* Schiff. has been elevated to a subspecies, however all I need say is that I can only distinguish my Kerry specimens from those of the New Forest by the labels.

Aegeria scoliaeformis Borkh. is found at Killarney, but after hard searching I have found no trace of it elsewhere, although Graves told me he had heard of it at Kenmare. It is an insect which sticks to one tree like *A. myopaeformis* Borkh. so that one containing old burrows in the bark will almost certainly also contain new. You can then dig the full-fed larva, which is a bark feeder, or find the newly-emerged moth on the tree if you are lucky. This has, however, occurred so frequently that I have a theory that the moth sometimes returns to sit on the bark in the sun as *myopaeformis* certainly does.

The only micro I shall mention is *Polychrosis dubitana* Steph. (*littoralis* Westw.). On the rocks in the sea near Adrigole where *Hadena capsophila* Dup., *H. cucubali* Schiff. and *H. caesia* Schiff. are found this eucosmid is common. The form is of a dull colour and very large; this is somewhat curious as the sea-coast form in the Isles of Scilly is the smallest known. I have never seen such large *dubitana* elsewhere, but unfortunately I did not bring back enough to be certain of the range of size.

**REPORT ON THE INSECTS COLLECTED BY THE E. W. CLASSEY
AND A. E. GARDNER EXPEDITION TO MADEIRA IN
DECEMBER 1957**

By A. E. GARDNER, F.R.E.S., AND E. W. CLASSEY, F.R.E.S.

Read 12th March 1959.

*"I do not know a spot on the globe which so astonishes
and delights upon first arrival as the island of Madeira"*

—Captain Marryat.

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INTRODUCTION.

When one of us (Gardner, 1955) discovered that the dragonfly *Sympetrum nigrifemur* (Selys), thought formerly to be a subspecies of *S. s. striolatum* (Charp.) was, in fact, a good species confined to the island of Madeira*, the seed that resulted in this Expedition was sown.

Only a few specimens in poor condition were known of this endemic dragonfly, and nothing of its ecology or life-history. Subsequent enquiries at the British Museum (Nat. Hist.) gave strength to our belief that a collecting trip would be well worth while. All specialists were eager to receive recent material in good condition, Mr. J. D. Bradley particularly wanting Microlepidoptera and Mr. R. L. Coe specimens of the dipteran, *Drosophila repleta* Wollaston. This species now widely distributed was described by Wollaston in 1858 from Madeira but no material from the type locality had subsequently been obtained.

Thanks to the generosity of the Trustees of the Godman Exploration Fund and the Percy Sladen Memorial Fund, grants were obtained which enabled preparations to be started. We were fortunate also that Mr. W. H. T. Tams was able to arrange leave to accompany us and give us the benefit of his vast entomological knowledge.

As Wollaston had taken specimens of the *Sympetrum* in December, we decided to start our trip in that month, a time which also suited both our business commitments. We agreed that one of us (E.W.C.) should handle the travel, currency and accommodation problems and that

*Recently I have been able to examine four ♂♂ and ♀ of *S. nigrifemur* taken in Tenerife during March 1947. I am indebted to Dr. M. A. Lieftinck of the Leiden Museum for the opportunity of studying this material.—A.E.G.

the other (A.E.G.) the collecting equipment and preservation of material. This arrangement worked perfectly even though the senior author was so careless as to lose some much needed currency from his pocket when hanging by his feet over an inaccessible gorge in an effort to obtain a very desirable specimen!

The results of our labours will, we think, speak for themselves. Over one thousand specimens were obtained, including series of many rare species. The dragonfly *Sympetrum nigrifemur* was found in fair numbers, its habits studied, and eggs were obtained which resulted in the senior author working out its life-history and obtaining a series of the adult larvae. One lepidopteron new to science was taken and two species are new to Madeira. One undescribed species of Coleoptera, and two further species new to the Island will be dealt with in a subsequent paper. A small series of the *Drosophila* resulted from our efforts in the wine lodges of Funchal—a pleasant diversion from working the steep and difficult montane regions. Had the weather been kinder and enabled us to work the desolate west and northern regions, had the propellor-shaft of our boat not broken or the Atlantic rollers prevented our reaching the island of Porto Santo, our results might have been even more encouraging. These setbacks, the knowledge that another *Sympetrum* flies in the sunshine of Porto Santo, the magnetic beauty of the scenery, all combine to make it certain that one day we will return to wrest more secrets from the "Pearl of the Atlantic".

Before dealing with the insect fauna in some detail, we think it advisable to give a brief outline of the topography, climatic conditions and general natural history in order that our readers can appreciate the diverse types of habitat and conditions which exist.

Madeira, a Portuguese island, lies in the Atlantic Ocean ten degrees north of the tropics in the temperate zone. The largest of a group of eight islands, it is 340 sea miles from Morocco, 480 from the Azores and 535 from Lisbon. Other islands of the Madeiran group are Porto Santo—about twenty-five miles to the north-east—the three Desertas, Ilheu Chao, Deserta Grande and Bugio—eighteen miles to the south-east—and the three Salvages which lie between the Madeira and the Canaries about 156 miles distant.

In shape, it is roughly oval, thirty-five and a quarter miles in length and thirteen and a quarter miles in width, and has an area of 240 square miles. Volcanic in origin, geologically ancient, it consists for the most part of a ridge of mountains running east to west. The highest point is the Pico Ruivo, 6,104 feet, and in all directions the island is cleft by great ravines running down from the mountains.

Except for the Sao Lourenço promontory to the south-east the coastline is rocky, high cliffs rising steeply, of which Cabo Girao, 1,804 feet, in the south, is the second highest headland in the world.

Largely due to the Gulf Stream, the climate is equable with little variation between summer and winter. Naturally, the temperature varies with the altitude and in this mountainous island habitats vary from subtropical at sea-level to near alpine on the peaks. The mean

temperature (Gordon-Brown, 1956) varies from 60°F. in February to 72.4°F. in August. Absolute maxima range from 78.7°F. in January to 102.6°F. in August; absolute minima from 47.3°F. in February to 64°F. in August. The prevailing wind is from the north-east and occasionally during the summer months a hot dry wind known as the *leste* blows across from the African desert, lasting, however, for only a few days.

The rainfall in Funchal is about 22 inches a year. March has the heaviest fall with over four inches, April just over one inch, and little rain occurs from May to September. Between October and February the monthly average ranges from two and a quarter to three and three-quarter inches. Funchal may be basking in sunshine when on the other side of the mountain barrier conditions may be very different. The lofty peaks may be capped with snow, cold winds may be raging and mist and rain may make crossing the Passes impracticable.

Rivers, ponds and lakes as we know them are non-existent. In the misty tree-filled stretches of mountain rock-face the air condenses in prodigious quantities, is transformed into streams and waterfalls and from the cloudy uplands the life-giving water is conducted by ducts or levadas to all the cultivated areas. No freshwater fish other than the eel, *Anguilla vulgaris* Day, are to be found. Recently, an attempt has been made to introduce the Trout, *Salmo trutta* L.

A very different picture is presented when we consider the marine life. The sea around Madeira is deep, varying from 1,500 to 3,000 fathoms. A warm sea current flows past its shores towards the S.S.W. at the rate of from twelve to sixteen miles per day. Some six miles off shore the big game fish, Tunny, Bonito and Blue Fish are encountered; in deep water, Swordfish, Giant Tunny and the Blue Shark. Closer inshore are found the Barracouta, Marbled Sea Perch and a multitude of smaller exotic species. Visitors are recommended to visit the Museu Municipal do Funchal where a fine collection of fish is housed and a small but excellent aquarium displays many local species in all their natural gaudy colours.

From Camara de Lobos in the south the fishing boats go out in the evening three to five miles off-shore in search of the espada, *Aphanopus carbo* Lowe. This, a large pitch-black eel-like fish is found below 800 fathoms, a line with 150 hooks being used. It is the principal commercial fish and, despite its forbidding appearance, the flesh is white and appetising—as well we can testify.

The vegetation ranges from sub-tropical to sub-alpine on the peaks. Over 3,000 species of plants have been recorded, mainly related to those found in south-west Europe, the Canaries and the Azores. About 100 species, including three tree ferns, are endemic. The rich volcanic soil and equable climate both combine to make conditions ideal for the cultivation of a rich and varied flora. Probably nowhere else in the world are so many genera confined in such a small area. It is in the south that the full brilliance and beauty of the vegetation is at its best. At the lower altitudes every garden is a blaze of colour. Purple and

mauve *Bougainvillea*, vivid red *Poinsettia* and *Hibiscus*, orange *Bignonia* and blue *Echium* all grow in happy abandon against a background of stately Date palms and Dragon trees. Despite its mountainous character every available square foot of land is cultivated. This by means of terracing is an essential feature of the island. Often the retaining wall is deeper than the terrace is broad, the red topsoil captive and loved. In Africa, it escapes hourly down to the sea. Fruits and vegetables from both the temperate zone and tropics flourish. Below 700 feet bananas and sugar cane are cultivated extensively; up to 1,500 feet vines grow on the terraces, planted generally at the edges; from 1,500 to 3,000 feet the principal crops are beans, cabbage, maize, wheat and stone fruits.

It is, however, above this cultivated zone that the greatest entomological prizes are to be found. First comes the area of thickets and pines above which the mountain sides are thickly clothed with Tree Heaths, *Erica arborea* L. and *E. scoparia* L. In this zone is to be found the endemic tree Til, *Ocotea foetens* Ait. The wood is black like ebony and is much used locally for cabinet work. Found sparingly in the south, it is a common feature of the northern landscape. The denuded southern watershed contrasts greatly with the richly wooded northern slopes. The reason for this is that when the Portuguese navigator Joao Gonsalves Zargo returned to the island after his initial discovery of Madeira in about 1419, it was decided to clear a portion of the thickly wooded area in the south. The method adopted was to set fire to the forests, the result being disastrous and far-reaching, for the fires burned for seven years. Beyond the tree-line the vegetation is sparse but many of the rare and endemic insects are to be found in this montane zone.

There are no mammals in Madeira except those which have been introduced. A few bats and rabbits are to be found, and on the Desertas feral goats and rabbits. The hundred acres of the Ilheu Chao are quite waterless during the summer months and Lockley (1941) thinks that the many rabbits which breed there rely on the ice-plant *Mesembryanthemum crystallinum* L. for water during the drought.

Over two hundred species of birds have been recorded, most of which are migrants from the African coast. About 36 species breed on the island. During our stay few birds were observed except for the melodious flocks of Canaries, *Serinus c. canaria* L.

The beautiful little Blue Chaffinch, *Fringilla coelebs maderensis* Sharpe was seen often at intermediate altitudes and always so unafraid of us that they could have been easily caught in our nets. In the Tree Heath, *Erica* forests a few Firecrests, *Regulus ignicapillus madeirensis* Vern. Harc. were seen and in the northern Laurel and Til zone a pair of the endemic Madeiran Pigeons, *Columba trocaz* Heineken were seen feeding on the fruits of the Til.

Only one species of reptile has been recorded: this the endemic Madeiran lizard, *Lacerta dugesii* Edwards, we found extremely common in the south. Often a dozen or more were seen basking in the sunshine on the stone walls, disappearing like a flash into the crevices as we

approached. At Ribeira das Cales (1,286 m.) a few were found under large boulders. These were sluggish and could be easily caught and handled.

ACKNOWLEDGMENTS.

We gratefully acknowledge the grants made by the Trustees of the Godman Exploration Fund and the Percy Sladen Memorial Fund. To the Trustees of the British Museum (Nat. Hist.) our best thanks are due for the loan of collecting equipment; to Mr. G. E. Maul and his staff at the Museu Municipal do Funchal we acknowledge the great help provided regarding information on localities of interest and for the generous gift of specimens; to Mr. and Mrs. G. E. Maul, Major and Mrs. C. H. C. Pickering we remember with pleasure the hospitality shown us; Professor Per Brinck gave us valuable information from his recent expedition, and Mr. David S. Smith spared no pains to provide us with maps and information from his previous trip. Our best thanks are due to the following specialists who gave us great assistance in identifying material from the Orders dealt with in this paper:—Professor L. Chopard, Doctors V. M. Dirsh, W. V. Harris, W. D. Hincks, D. R. Ragge, I. H. H. Yarrow, and Messrs. R. B. Benson, J. D. Bradley, R. L. Coe, D. S. Fletcher, K. A. Spencer, and W. H. T. Tams.

LIST OF SPECIES COLLECTED.

The Coleoptera, Hemiptera, Neuroptera and Odonata are not included in the following list. This is due to the amount of time needed to make the necessary microscopical preparations and drawings to illustrate the life-history of the dragonfly *Sympetrum nigrifemur* and the unavoidable delay regarding Coleoptera determinations. It is hoped to publish Part II dealing with these Orders in the Society's subsequent Proceedings and Transactions.

Specimens have been deposited in the British Museum (Nat. Hist.), Hope Department, Oxford, Liverpool Public Museum and with specialists who have given such valuable assistance. A representative collection has been retained by the senior author.

With regard to the Orders Dermaptera, Saltatoria and Dictyoptera, we have endeavoured to list all known species from Madeira and to include as full a list of localities as possible.

DERMAPTERA

Thirteen species of earwigs have been recorded and, of these, seven are endemic. Although we worked assiduously for the rare species we were unsuccessful and only found the two *Anisolabis* and *Forficula auricularia* (L.).

The moist sylvan districts of intermediate altitudes and the more barren montane zones would appear to be the more favoured habitats. It is probable that the comparatively unworked northern and western mountain ranges support species yet to be described.

LABIDUROIDEA.

LABIDURIDAE.

Anisolabis annulipes (Lucas).

Burr (1912) refers to this species as the common earwig of the Island. Chopard (1937) associates it with agricultural regions up to 800 metres. Specimens were collected from under stones on Funchal beach in company with *A. maritima* (Gené); common under stones on the mountainous region of Palheiro Ferreiro (616 m.); Camacha (684 m.); Santana (436 m.); Chao das Feiteiras (1,278 m.) and at a slight elevation at Gorgulho. There are specimens in the Funchal Museum from Santa Roque (384 m.).

Other records: Borelli (1906), Funchal, Poiso; Burr (1912), Funchal; Chopard (1937), Sao Vicente; Hincks (1938), Monte, Funchal, Estrella Calheta; Chopard (1942), Funchal, Ribeira Brava and Ribeiro Frio.

Distribution: Cosmopolitan.

Anisolabis maritima (Gené).

Although Chopard (1937) associates *A. maritima* with the littoral zone, no localities are cited. From the lack of records it would appear to be rare since this conspicuous insect can hardly be overlooked. There are a few specimens in the Funchal Museum taken locally by Mr. G. E. Maul. Three males and seven females were taken under stones and refuse on Funchal beach near the mouth of the Ribeira de Santa Luzia.

Distribution: Cosmopolitan.

Labidura riparia (Pall.).

This handsome species occurs on sandy areas in the littoral zone. Recorded by Borelli (1906) environs of Funchal; Burr (1912), Funchal; Chopard (1937), Santana, Caniçal, Deserta Grande. There are specimens in the Funchal Museum taken by Mr. G. E. Maul from Porto Santo Island about 25 miles north-east of Madeira where they were common on the sandy beach and attained a large size.

Distribution: Cosmopolitan.

Labia minor (L.).

Chopard (1937) records a specimen from Funchal, and Burr (1912) mentions that there are specimens from Madeira in the Königsberg Museum.

Distribution: Cosmopolitan.

Labia curvicauda (Mots.).

Borelli (1906) records this species from Funchal, Porto da Cruz; Burr (1912), Funchal, common in the Seminario; Chopard (1942), Funchal.

Distribution: Cosmopolitan.

FORFICULIDAE.

Anechura schmitzi (Borelli).

Recorded by Borelli (1906), Poiso, Funchal; Chopard (1937), Monte; Hincks (1938), Chao das Feiteiras.

Distribution: Endemic.

Perirrhytus edentulus (Woll.).

First discovered by Wollaston (1858) at the base of the lofty perpendicular rocks near the upper extremity of the Ribeira de Santa Luzia. Chopard (1937) associates this species with the zone of Laurels and Tree Heaths at 1,000 to 1,400 m.

Other records: Borelli (1906) Funchal; Chopard (1937 and 1942) Rabaçal, Sao Jorge, Encumiada, Camacha, Monte, Ribeiro Frio; Hincks (1938) Rabaçal, Funchal, Risco.

Distribution: Endemic.

Perirrhytus madeirensis (Borelli).

Occurs in similar localities as the preceding species. Recorded by Borelli (1908) Funchal; Chopard (1937) Seixal; Hincks (1938) Rabaçal, Risco.

Distribution: Endemic.

Perirrhytus lundbladi Hincks.

Discovered by Dr. O. Lundblad, 12.viii.1935, at Caramujo. Other records are: Hincks (1938) Ribeiro do Inferno, Chao das Feiteiras.

Distribution: Endemic.

Forficula auricularia (L.).

Chopard (1937) associates this species with mountainous areas above the 1,500 m. level. Although a few specimens were found at lower altitudes in the Pine and Tree Heath zone, it was in the more sparsely covered montane zone at higher elevations that *F. auricularia* became the dominant species. Odd specimens were found under stones at Choupana (743 m.), Ribeira das Cales (1,286 m.) common, Chao das Feiteiras (1,278 m.). At this latter locality, desolate and windswept, *auricularia* was found under nearly every large stone. The macrolabious v. *forcipata* Steph. was numerous. A number of specimens have been examined but no brachypterous examples were found.

Other records: Borelli (1906) Funchal, Poiso; Burr (1912) Grande Corral; Chopard (1937 and 1942) Monte, Camacha, Encumiada (1,100 m.), Santo Antonio da Serra, Paul da Serra (1,500 m.), Calheta, Ribeiro Frio, Rabaçal, Porto Novo; Hincks (1938) Chao das Feiteiras, Paul da Serra (1,250 m.), Caramujo, Rabaçal. There are specimens in the Funchal Museum from Santo da Serra, Ribeiro Frio and Monte da los Barreiros.

Distribution: Europe, Western and Northern Asia, North Africa, North America, Australia and Oceania.

Forficula laeviforceps Chopard.

Apparently a montane species. Recorded by Chopard (1937) from the Paul da Serra (1,600 m.), an elevated plateau in the west of the island.

Distribution: Endemic.

Forficula barroisi Bolivar.

Recorded by Chopard (1937) from Caniçal and considered by that author to be a representative of the fauna belonging to the low, sandy eastern extremity of the island.

Distribution: Endemic.

Forficula brevitarsis Chopard.

Described by Chopard (1942) from a single female taken by R. Frey, 5.v.38, from Porto Novo.

Distribution: Endemic.

SALTATORIA

If we include all the species, even those with a doubtful claim to being on the Madeiran list, only 23 species are represented. Although not presenting such an impoverished fauna as the Azores, Madeira is not so rich in species as the Canary Islands. Four endemic species are represented, the rest being mainly Mediterranean species. Of the former, *Calliptamus madeirae* Uvarov is associated with the rich vegetation of the agricultural zone, *Euchorthippus madeirae* Uvarov and *Metrioptera barretoï* (Burr) are montane species and *Psalmatophanes barretoï* Chopard is associated with the zone of pines and thickets.

It is interesting to note that *Phaneroptera nana nana* Fieber and *P. nana sparsa* Stål both occur on the Island. Although both have been probably introduced they appear to be kept apart by their different temperature requirements.

ACRIDOIDEA.

ACRIDIDAE.

Calliptamus madeirae Uvarov.

Despite a careful search, we were only able to capture a few specimens of this interesting locust. Chopard (1937) associates it with the agricultural zone. It is closely allied to the Canarian *C. plebeus* (Walker). One male and two females were taken in rough ground at Pico da Ponta Cruz, and a single female in a potato field on the mountainside at Palheiro Ferreiro (616 m.). Recorded by Burr (1912), Chopard (1937), Funchal, Camacha, Santo Antonio da Serra, Grande Curral, Poiso, Paul de Serra, Sao Vicente, Seixal; Uvarov (1937) Funchal, Grande Curral, Machica. There are specimens in the Funchal Museum from Choupana, Ribeiro Frio and Caniçal. Barreto (in Chopard, 1937) records it from the Desertas. Specimens have been taken in the months of July, September, October and December.

Distribution: Endemic.

Schistocera gregaria (Forsk.).

Recorded by Burr (1912). There are specimens in the Funchal Museum taken locally 28.xi.50, 28.xi.53 and 5.xii.53.

Distribution: Hot palaearctic deserts, swarm migrants temporarily extending beyond these limits both north and southwards.

Oedaleus decorus (Germ.).

Burr (1912) records this species as found sparingly at the lower levels but in great numbers in the mountains. Chopard (1937) associates it with altitudes above 1,500 m. Recorded by Chopard (*op. cit.*) Santo Antonio da Serra, Grande Curral, Camacha, Paul da Serra, Poiso; Uvarov (1937), Rabaçal, 1,080 and 1,250 m., Paul da Serra. There are specimens in the Funchal Museum from Choupana, Santo Antonio de Serra and Funchal.

Distribution: North Africa, Southern Europe and Western Asia

Locusta migratoria danica (L.).

A single male was captured at Pico da Ponta Cruz on the edge of a sugar cane plantation, two males and a single female on rough ground at Choupana. Burr (1912) records the Migratory Locust as common everywhere; Chopard (1937), Funchal, Santo Antonio da Serra; Uvarov (1937) Machico. There are specimens in the Funchal Museum from Choupana, Funchal, Caniçal, Ribeiro Frio and Santo Antonio da Serra.

Distribution: From tropics to temperate zone of the Old World.

Acrotylus sp.

Burr (1912) says "Serville describes a species which evidently resembles *Acrotylus insubricus* Scop.; he names it *Oedipoda maderae* (Orth., p. 730, 1839), which de Saussure sinks as a queried synonym of *Thalpomena algeriana*, and for this reason, Kirby records it under the name of *Thalpomena maderae*. Probably it is *Acrotylus insubricus*, as this is a common European species, which extends as far as the Canaries, and there is no improbability in its occurring in Madeira, though we failed to find it".

Collecting at Pico da Ponta Cruz, a rich locality for Orthoptera, one of us (A.E.G.) took a pink-winged grasshopper in long grass near the extensive growth of *Opuntia*. On examination it proved to be an *Acrotylus* but, on transferring the insect to a tube it escaped, and despite a feverish search could not again be located. Thus was lost the opportunity of settling the vexed question of an *Acrotylus* in Madeira.

Sphingonotus rubescens (Walker).

This species seems confined to the low, sandy Sao Lourenço promontory and the Desertas. Recorded by Chopard (1937), Caniçal, Desertas. There are specimens in the Funchal Museum from Caniçal and Deserta Grande.

Distribution: Eremian Region.

Sphingonotus coerulans (L.).

Included on the strength of Burr's (1912) statement, "there are specimens in the Museum; it is recorded from the island by Brunner".

Distribution: Central and Southern Europe, North Africa.

Aiolopus strepens (Lat.).

Common in the zone of pines and thickets. Numerous specimens were collected from Ribeira das Cales (1,286 m.), Camacha (684 m.), Palheiro Ferreiro (616 m.), Choupana and Santana. Also recorded by Burr (1912), Grande Curral; Chopard (1937), Camacha, Santo Antonio da Serra, Caniçal, Santana; Uvarov (1937 and 1942), Calheta, Frio, Poiso (1,400 m.), Rabaçal (1,250 m.), Paul da Serra, Caramujo (1,250 m.), Chão das Feiteiras.

Distribution: Canary Islands, Madeira and Mediterranean region.

Aiolopus thalassina (F.).

The common grasshopper of the Island. Associated by Chopard (1937) with the zone of pines and thickets but also found down to sea level. Uvarov (1937) noted that the Madeira specimens were small compared with European examples and preferred to leave them without a name until the group is revised. A long series from various localities in the Canary Islands collected by Mr. E. S. A. Baynes and in the collection of Gardner appear identical with the Madeira specimens. Numerous examples were obtained from Pico da Ponta Cruz (261 m.), Palheiro Ferreiro (616 m.), Camacha (684 m.), Choupana and a few from gardens in Funchal.

Burr (1912) mentions that it swarms everywhere; Chopard (1937), Funchal, Caniçal, Sao Vicente, Santana; Uvarov (1937 and 1942), Funchal, Ribeira Brava, Machico (200 m.).

Distribution: Canary Islands, Africa, Mediterranean region and Western Asia.

Dociostaurus maroccanus (Thunb.).

Burr (1912) mentions that the species is recorded from Madeira by Kirby but the authority is unknown.

Distribution: Very abundant in the Mediterranean region, Western and Central Asia.

Chorthippus apicalis (H.-S.).

There are specimens in the Funchal Museum from Santo Antonio da Serra and Santa da Luta. Recorded by Chopard (1937) from the former locality in the open regions of gorse and grass.

Distribution: Madeira, Southern Europe, Morocco.

Euchorthippus madeirae Uvarov.

Recorded by Burr (1912) as *Chorthippus pulvinatus* (F.W.) who took three females in the Grande Curral on the steep mountain slopes above the pines. It is a montane species and has been recorded by Chopard (1937) from Rabaçal, Paul da Serra, Poiso, Santo Antonio da Serra,

Camacha; Uvarov (1937), Rabaçal (1,080 and 1,250 m.), Paul da Serra, Caramujo (1,250 m.), Chao das Feiteiras. There are specimens in the Funchal Museum from Santa da Luta, Santo Antonio da Serra, Pico Ruivo da Santanna and Pico do Arieiro (1,800 m.).

Distribution: Endemic.

TETTIGONIIDAE

Decticus albifrons (F.).

This magnificent insect is recorded by Burr (1912) as common. Chopard (1937) records it from the environs of Funchal, Santo Antonio da Serra and very common on the southern slopes of the mountain between Calheta and the tunnel of Rabaçal. It frequents rough herbage and betrays its presence with its loud clattering stridulation. There are specimens in the Funchal Museum from Santo Antonio da Serra and Caniçal.

Distribution: Madeira, Canary Islands, Southern Europe, North Africa and Western Asia.

Psalmatophanes barretoii Chopard.

Another magnificent Tettigoniid which was discovered by Chopard (1937) in the pine, thicket and gorse zone. It was detected by its stridulation which is comparable with that of *Tettigonia viridissima* L. Rare and only recorded from Seixal, Santana and Santo Antonio de Serra.

Distribution: Endemic.

Platypleis falki (F.).

Recorded as *Platypleis grisea* (F.) by Burr (1912) who took specimens on the higher slopes of the Grande Curral. Chopard associates it with the zone of pines and thickets and records specimens (1937) from Monte, Santo Antonio da Serra, Camacha, Grande Curral and Caniçal. There are specimens in the Funchal Museum from Santo Antonio da Serra and Santa da Luta.

Distribution: Mediterranean region, Madeira, Azores.

Metrioptera barretoii (Burr).

Burr (1912) discovered a pair of this curious brachypterous Tettigoniid on the grassy slopes of the Grande Curral above the tree line, 2nd October 1910. Chopard (1937) associates it with the montane zone and records specimens from the Grande Curral and the plateau of the Paul da Serra at about 1,700 m. Uvarov (1937) also records one female from the Paul da Serra (1,250 m.) and two larvae probably belonging to this species from Feiteiras. There are specimens in the Funchal Museum from Pico do Arieiro (1,800 m.).

Distribution: Endemic.

Homorocoryphus nitidulus (Scop.).

This handsome green species was taken in a garden in Funchal and on rough ground at Gorgulho and Pico da Ponta Cruz. All the specimens

were taken at night, our attention being attracted by its continued and loud stridulation. Burr (1912) records it as not being rare in some ribeiras; Chopard (1937), environs of Funchal, Santana; Uvarov (1937), one larva at Monte.

Distribution: Widely spread in the tropics and subtropics of the Old World, extending into Southern Europe.

Phaneroptera nana nana Fieb.

This more northern subspecies seems confined to the higher elevations above 200 m. Ragge (1956) records it from Ribeira do Bento. There are specimens in the British Museum (Nat. Hist.) taken by Wollaston but no localities are given. Chopard (1937), near Funchal. A single female was flushed from grass on the barren southern slope near the summit of Pico da Ponta Cruz (281 m.).

Distribution: Madeira, Azores, Mediterranean region, western Arabia, Africa and Madagascar.

Phaneroptera nana sparsa Stål.

Two male specimens from Madeira were examined by Ragge (1956), but no localities could be cited. This author is of the opinion that this southern subspecies has been introduced to Madeira comparatively recently, also possibly *Ph. n. nana*. In view of the fact that a large number of plants and ornamental shrubs have been introduced, this is a reasonable theory. It is interesting that we took one male from an ornamental shrub in Funchal, three males, three females and two larvae from thickets at the southern base of the Pico da Ponta Cruz at no great elevation. The specimens referred to by Burr (1912) as common in the ornamental shrubs in hotel gardens probably refer to this subspecies. Although the two subspecies have now been established as occurring in the south of the Island each appears to be confined to its typical habitat, *Ph. n. nana* being restricted to the more Mediterranean-type vegetation and temperature and *Ph. n. sparsa* to the warmer and more subtropical vegetation at low altitude.

Distribution: Africa south of the Sahara Desert, western and southern Saudi Arabia, and northwards through the Levant. Madeira, Canary Islands, Socotra, Madagascar, and some of the other islands of the western Indian Ocean (Ragge, *op. cit.*).

GRYLLOIDEA.

GRYLLIDAE

Gryllus bimaculatus (Deg.).

Common from sea-level to intermediate altitudes and not uncommon in the gardens of Funchal and environs. Although generally found under large stones and logs, specimens were often seen during the day after heavy rain, presumably having been dislodged from their retreats. Specimens were collected from Funchal, Pico da Ponta Cruz (261 m.), Ribeira das Cales (1,286 m.), Palheiro Ferreiro (616 m.), Camacha (684

m.), Choupana and Santana. Also recorded by Chopard (1937 and 1942), Funchal, Ribeira Brava, Santana, Camacha, Canical, Camara de Lobos, Sao Vicente, Santo Antonio de Serra; Uvarov (1937), Rabacal, Paul da Serra (1,250 m.).

Distribution: Tropics and subtropics of the Old World and South of Europe.

Acheta domesticus (L.).

Recorded by Chopard (1937), Funchal; Uvarov (1937), Calheta. There is a specimen in the Funchal Museum from the Island of Porto Santo.

Distribution: A native of Palaearctic deserts. Now widely distributed by introduction.

Gryllulus hispanicus (Ramb.).

One adult male taken at night on a wall at Gorgulho where immature specimens were abundant under stones on the beach. Also recorded by Chopard (1937 and 1942) from Funchal.

Distribution: Atlantic islands and Mediterranean region.

Mogoplistes squamiger (F.R.).

This delicate apterous cricket was found to be common under large stones on the beach at Funchal in the vicinity of the mouth of the Ribeira de Santa Luzia. Searching for this rare species during the day only produced the odd specimen but a long series was obtained by collecting at night. They are extremely active and easily damaged so experience taught us to look for specimens under large stones on the firm sand some way above the high tide mark. Here they were more easily observed and more readily captured. One specimen was watched feeding on an old apple core. Mr. Maul (*in litt.*) records that when the Atlantic gales bring abnormally high tides the crickets are driven from their stony fortress and invade the nearby road and pathways. Chopard (1937) also records *M. squamiger* from Funchal.

Distribution: Atlantic islands and shores of the Mediterranean. Bowen and Williamson (1950) discovered this species in England on Chesil Beach, Dorset, where it has since been taken several times. Although thought by many to be an introduction we were particularly impressed by the striking likeness between the *squamiger* localities at Funchal and Chesil Beach.

Oecanthus pellucens (Scop.).

This delicate little cricket is recorded by Chopard (1937), environs of Funchal, Santa Marinho, Santo Antonio, Santana.

Distribution: Widely distributed in the Old and New World.

Oecanthus sp.

Uvarov (1937) records two larvae from Rabaçal.

DICTYOPTERA

Nine species of Blattids are recorded of which only one, *Arbiblatta infumata* (Brunner) is endemic. *Zetha chavesi* (Bol.) is restricted to the Atlantic Islands, whilst *Ectobius panzeri* Stephens has in the male the glandular depression on the seventh tergite of a shape different from that of the French examples examined by Chopard (1937). This species also inhabits a higher altitude and different type of habitat as compared with its normal distribution. The remaining species, mainly cosmopolitan, have most probably been introduced and, finding the climate in the south congenial, have become established. The single Mantis *Mantis religiosa* (L.) is another probable introduction but appears to be rare.

BLATTOIDEA.

ECTOBIIDAE.

Ectobius panzeri Steph.

A number of specimens found under large stones at Ribeira das Cales (1,286 m.). Several very dark females are referable to v. *nigripes* Steph. Chopard (1937) associates this species with the zone of pines and thickets; these at some altitudes are in great contradistinction to the more normal coastal habitats. Also recorded by Chopard (*op. cit.*), Santo Antonio da Serra, Camacha.

Distribution: Madeira, Europe.

Arbiblatta infumata (Brunner) = *Blatta ericetorum* Wollaston.

First recorded by Wollaston (1858), who wrote, "occurring principally beneath the loose outer fibre of the gigantic Heathtrees, on the upper limits of the sylvan districts, from about 4,500 to 5,000 feet above the sea". Also recorded by Burr (1912), Poiso; Hanitsch (1938), Rabaçal (1,080 m.), Caramujo (1,250 m.), some under stones, a few in the *Erica* forest; Chopard (1942), Rabaçal.

Distribution: Endemic.

Battella germanica (L.).

As far as we are aware this species has not been recorded from Madeira. There are specimens in the Funchal Museum collected recently by Mr. G. E. Maul from the new market at Funchal.

Distribution: Cosmopolitan.

Loboptera decipiens (Germ.).

Chopard (1937) associates this species with the zone of pines and thickets. A few immature specimens were found under stones at Gorgulho. Burr (1912) found larvae common in all localities; Chopard (1937 and 1942), environs of Funchal, Santo Antonio da Serra, Caniçal, Rabacal, Catheta; Hanitsch (1938), Machico, Chao das Feiteiras, Monte; Bolivar (1915), Deserta Grande. There are specimens in the Funchal Museum from Ribeira de Joao Gomes, Choupana and Caniçal.

Distribution: Southern Europe and Asia Minor.

BLATTIDAE.

Blatta orientalis L.

Numerous specimens were found at night on refuse in the harbour at Funchal. Immature specimens under stones at Palheiro Ferreiro (616 m.). Chopard (1937 and 1942) records the species from Funchal, Sao Jorge, Sao Vicente; Hanitsch (1938), Funchal, Estrella Calheta. There are specimens in the Funchal Museum from Funchal and Sao Roque.

Distribution: Cosmopolitan.

Periplaneta americana (L.).

Common in the harbour area of Funchal. At night numerous specimens were collected from walls and pavements both in the town and environs. Recorded by Chopard (1937 and 1942), Funchal; Hanitsch (1938), Funchal.

Distribution: Cosmopolitan.

Leucophaea maderae (F.).

A single example found at night in Funchal. Chopard (1937) records it from Funchal and found commonly in the provision warehouses. Local specimens are also in the Funchal Museum.

Distribution: Cosmopolitan in the tropics and subtropics.

Pycnoscelus surinamensis (L.).

A single specimen taken at night in Funchal. Also recorded from Funchal by Chopard (1937). There are specimens in the Funchal Museum from the town, Camara de Lobos and Barreiros.

Distribution: Cosmotropical.

Zetha chavesi (Bolivar).

Chopard (1937) records a single male from Camara de Lobos.

Distribution: Madeira and Azores.

MANTOIDEA.

MANTIDAE.

Mantis religiosa (L.).

Apparently rare. Three oothecae found on bramble at Pico da Ponta Cruz (261 m.) on rough ground among *Opuntia*. There are specimens in the Funchal Museum, also recorded by Chopard (1937), Funchal.

Distribution: Central and Southern Europe, North Africa and Asia.

ISOPTERA

The following termites have been recorded from Madeira:

KALOTERMITIDAE.

Kalotermes barretoï Grassé.

Recorded from dead branch of chestnut.

Neotermes praecox (Hag.).

Recorded from dead branches of a wide variety of trees. An endemic species.

Cryptotermes brevis (Walk.).

This, the West Indian drywood termite has been introduced into Madeira and has caused considerable damage to dwelling places and public buildings in Funchal. It has also been recorded from Central America, Caribbean, West Africa, Natal, Pacific Islands, Hong-Kong, St. Helena and the Canaries.

RHINOTERMITIDAE

Reticulitermes lucifugus (Rossi) 1792 = *Termes madeirensis* Heer vide Hagen (1858).

This European subterranean termite is recorded from Madeira by Burr (1912) and McLachlan (1883). The latter mentions specimens common near Arrabento, where fully-winged specimens were found on 25th April and near Palheiro, 9th May. We found several colonies under large stones above the Ribeira das Cales (1,286 m.), both workers and soldiers being present.

LEPIDOPTERA

Considering the climate and rich vegetation the lepidopterous fauna of the Madeira Islands is meagre, only about 180 species being known. Nevertheless, the fauna is interesting as a fair number of endemic species and forms are represented, and almost certainly new species await discovery in the west and northern mountainous regions.

Considering the time of the year, poor weather, and time available for collecting, we were not displeased with the results obtained. Fifty-seven species were recorded, *Blastobasis acuta* Bradley being new to science, *Homocosoma nesiotica* Rebel and *Psara bipunctalis* F. new to Madeira and series of several species required for the National Collection were obtained.

In the main the fauna is Mediterranean with a small North African element. Many cosmopolitan species have no doubt been introduced. The American element represented by *Cobaliodes dubiosa* Baker can be discounted as Mr. W. H. T. Tams finds that *dubiosa* must be removed from the American genus *Cobaliodes* and placed in *Euplexia*.

Thirteen species of Rhopalocera are recorded. *Pieris brassicae wollastoni* Butler, a dark insular form approaching the Canarian *cheiranthi* Rebel, occurs at Rabaçal, Caramujo and Chao des Feiteiras. Martin (1941) records it as common in "Kulturgarten von Santo da Serra" and the fields of Ribeiro Frio. *Gonepteryx cleopatra* v. *maderensis* Felder, a handsome form with the forewings nearly all orange, is not common and appears restricted to the more northern part of the Island. Other interesting species not recorded by us include *Satyrus semele maderensis* Baker, also recorded from the Azores, and *Danaus plexippus* L. This latter species is not common in Madeira

but occurs in some numbers on the Island of Porto Santo some 25 miles to the north-east. Since it also occurs in the Azores and is common in the Canary Islands could not specimens taken in Britain have come from the Western Atlantic Islands rather than America, assisted or otherwise by shipping, as is more generally supposed? The first *plexippus* appears to have been taken in Britain in 1876 (Williams, 1958) yet it was well established and common in the Canary Islands in 1894 (Holt White). Support to this theory is given by the fact that at times meteorological conditions are also ideal. It will be remembered that in October 1954 specimens of the Desert Locust (*Schistocera gregaria* (Forsk.)) were reported from Cornwall, the Scillies and South Ireland. The locust swarms originated in Southern Algeria and the Rio de Oro when strong southerly winds were established over most of the eastern Atlantic.

Hypolimnna misippus ab. *inaria* Cramer is another migratory species which does not appear to be established.

The Sphingidae are represented by five species: *Acherontia atropos* L., *Herse convolvuli* L., *Celerio euphorbiae* L., *C. livornica* Esp., and *Macroglossum stellatarum* L. At times *H. convolvuli* is so common in June and July the children use them as playthings, holding them by the proboscis and letting them flutter. The Arctiidae are so far represented by a single species, *Utetheisa pulchella* L., which was recorded by Cockerell (1923) as having been taken by him at Funchal early in May 1879.

Other interesting species not seen by us include the endemic Noctuid, *Chutapha wollastoni* Bethune-Baker; the Geometrid, *Cosymbia maderensis* Bethune-Baker which is a very variable species, and the three endemic *Ptychopoda*—*P. maderae* Bethune-Baker, *P. zargi* Bethune-Baker and *P. atlantica* Staint.

Cockerell (*op. cit.*) observes that there appear to be only two endemic species from Porto Santo and the Desertas. These are *Lita portosanctana* Staint. from Porto Santo and *Lita pulchra* Woll. from the Desertas. This is interesting as these widely separated islands of different geological formation have in the Coleoptera closer affinities with each other than each has to the central mass of Madeira.

Species collected include the following species:

PIERIDAE.

Colias croceus Fourc.

Palheiro Ferreiro, one ex.; Pico da Ponta Cruz, one ex.

SATYRIDAE.

Pararge xiphia F.

Palheiro Ferreiro, two freshly emerged specimens.

NYMPHALIDAE.

Vanessa atalanta L.

Funchal, one ex.

Vanessa cardui L.

Funchal, one ex.; Choupana, one ex.

Pyrameis indica occidentalis C. & R. Felder.

Funchal, one ex. This handsome species was seen several times in the ornamental gardens at Funchal; also at Gorgulho and Pico da Ponta Cruz.

Argynnis lathonia L.

Choupana, one ex.

LYCAENIDAE.

Lycaena phlaeas phlaeoides Staud.

Fairly common at intermediate altitudes in the pine and thicket zone flying in the open spaces. Specimens were collected from Palheiro Ferreiro, Choupana, and Pico da Ponta Cruz.

Lampides boeticus L.

Common from sea-level to intermediate altitudes. Specimens were collected from Gorgulho, Choupana, Pico da Ponta Cruz and Palheiro Ferreiro.

SPHINGIDAE.

Celerio euphorbiae L.

A number of larvae were collected from *Euphorbia* sp. growing on waste land at Pico da Ponta Cruz. No adult specimens were bred as every larva was parasitized.

NOCTUIDAE.

Agrotis segetum Schiff.

Funchal, three ex.

Agrotis ipsilon Hufn.

Funchal, one ex.

Peridroma saucia Hübn.

Funchal, one ex.

Mythimna unipuncta Haw.

Funchal, three ex.

Leucania loreyi Dup.

Funchal, two ex.

Cryphia simonyi Rogenhofer.

Funchal, one ex. Confined to Madeira and the Canary Islands.

Sesamia nonagrioides Lef.

Funchal, one ex.

Callopistria latreillei Dup.

Funchal, one ex.

Euplexia dubiosa Baker **com. nov.**

Funchal, one ex. This endemic species was formerly placed in the American genus *Cobaliodes* Dyar but Mr. W. H. T. Tams has examined the genitalia of our male and other specimens in the British Museum

(Nat. Hist.) and finds that the structure has greater affinities with those of species of *Euplexia*.

Athetis rebeli Staud.

Funchal, 55 ex. Madeira and the Canary Islands.

Perigea conducta Walk.

Funchal, one ex.

Prodenia litura F.

Funchal, ten ex.

Plusia limbirena Guen.

Funchal, two ex.

Plusia circumflexa L.

Funchal, one ex.

Plusia chalcites Esp.

Funchal, two ex.

Plusia orichalcea F.

Funchal, one ex.

Plusia gamma L.

Funchal, one ex.

Hypona obsitalis Hübn.

Gorgulho, one ex.

Hypona lividalis Hübn.

Funchal, one ex.; Gorgulho, three ex.

GEOMETRIDAE.

Scopula irrorata Bethune-Baker.

Funchal, two ex.; Monte, one ex.; Choupana, one ex.; Gorgulho, one ex. Endemic species.

Nycterosia obstipata F.

Funchal, one ex.

Eupithecia latipennata Prout.

Funchal, one ex. Endemic species.

Gymnoscelis lundbladi Prout.

Funchal, nine ex. Endemic species.

Gymnoscelis pumilata insulariata Staint.

Monte one ex. Madeira and the Canary Islands.

PYRALIDAE.

Cryptoblabes gnidiella Millière.

Funchal, seven examples; Gorgulho, two ex.

Homoeosoma nesiotica Rebel.

Funchal, three ex.; Choupana, one ex.; Gorgulho, one ex. Previously known only from the Canary Islands and new to the Madeira list (Bradley, 1958).

Pyrausta farinalis L.

Funchal, one ex.

Eudoria stenota Wollaston.

Ribeira das Cales, three ex.; Palheiro Ferreiro, one ex.; Santana, one ex.

Eudoria angustea Stainton.

Funchal, two ex.; Terreira da Lucta, one ex.; Ribeira das Cales, one ex.; Camacha, one ex.

Uresiphita gilvata F.

Funchal, one ex.

Udea martialis Guen.

Fourteen examples from various localities. A common species in Madeira.

Psara bipunctalis F.

Gorgulho, two ex. New to the Madeira list (Bradley *op. cit.*).

PYRAUSTIDAE.

Margaronia unionalis Hübn.

Funchal, one ex. Not included in Bradley's 1958 list.

PTEROPHORIDAE.

Pterophorus monodactylus L.

Funchal, one ex.; Gorgulho, one ex.

TORTRICIDAE.

Crociosema plebejana Zell.

Funchal, two ex.

Bactra venosana Zell.

Gorgulho, one ex. Reported only once before in Madeira (Rebel, 1940c).

Enarmonia leplastriana Curtis.

Funchal, three ex.; Gorgulho, one ex.; Santana, one ex. Bradley (*op. cit.*) finds this species conspecific with *Ephippiphora maderae* Wollaston.

OECOPHORIDAE.

Oegoconia fasciata Stainton.

Funchal, two ex.

BLASTOBASIDAE

Blastobasis lavernella Walsingham.

Funchal, one ex.; Choupana, one ex.

Blastobasis decolorella Wollaston.

Funchal, one ex.

Blastobasis desertarum Wollaston.

Twenty-three examples from various localities. Widely distributed and common in Madeira.

Blastobasis lignea Wals.

Terreira da Lucta, one ex. Bradley (*op. cit.*) considers this species to be conspecific with *flavescentella* Rebel.

Blastobasis acuta Bradley. (1958. *Entomologist*, 91: 194.)

Type male: Funchal. Paratypes: two males Gorgulho, one male Terreira da Lucta, one male Funchal. Type and paratypes in the British Museum (Natural History). The specimens of this new species were taken by us from Funchal and Gorgulho at light.

LITHOCOLLETIDAE.

Lithocolletis messaniella Zell.

Palheiro Ferreira, one ex.

LYONETIIDAE.

Opogona subcervinella Walk.

Funchal, two ex.; Gorgulho, one ex.

Opogona omoscopa Meyr.

Funchal, seven ex.

TINEIDAE.

Monopis crociacapitella Clemens.

Palheiro Ferreira, one ex.

Niditinea spretella Schiff.

Funchal, one ex.

HYMENOPTERA

Despite the luxurious subtropical vegetation at the lower levels few species of Hymenoptera were seen. Species collected include the following:

ICHNEUMONIDAE.

Ctenichneumon hermaphroditus Tschek

Palheiro Ferreira, one female.

FORMICIDAE.

Tapinoma erraticum Lat.

Ribeira das Cales; Chao das Feiteiras. Four females, ten workers. Common under stones.

POMPIDIDAE.

Priocnemis sp. Choupana, one specimen.

VESPIDAE.

Vespa germanica F.

Ribeira das Cales, one female; Palheiro Ferreira, one worker; Santana, one worker.

Polistes gallicus L.

Funchal, one worker; Sao Jorge, one worker.

Ancistrocerus gazella Panz.

Palheiro Ferreira, one female.

Ancistrocerus maderae Sauss.

Palheiro Ferreiro, two females.

SPHECIDAE.

Liris nigrita Lepeletier

Gorgulho, one female of this fine insect taken over a stone wall which it persistently revisited.

APIDAE.

Bombus terrestris L.

Funchal, 19 females, all at a row of white-flowered shrubs in the gardens near the harbour; Palheiro Ferreiro, one male and female.

Apis mellifera L.

Gorgulho, one worker.

DIPTERA

Although over 300 species including many endemic forms occur, we were only able to make a small collection. These have been deposited in the British Museum (Nat. Hist.) and await identification. The most interesting species taken appears to be *Drosophila repleta* Wollaston. A short series was taken in wine lodges and hotels in Funchal and represents the first specimens taken in the type locality since the species was originally discovered by Wollaston in 1858. From leaf-mines brought back, Mr. K. A. Spencer bred out the following species:—*Phytomyza atricornis* Meig., Santana, 3 examples; *Scaptomyza* sp., Funchal, 1 example from *Nasturtium* sp.

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LARVAE OF THE BRITISH LEPIDOPTERA NOT FIGURED BY BUCKLER

PART IV

Compiled and illustrated by G. HAGGETT

Laphygma exigua Hübner. Small Mottled Willow.

Since the practice of rearing from rare moths has become more regularly adopted the larva of *L. exigua* has become better known to British collectors and the moth, like so many migrants, no longer looked upon as a prize; even so it has only occasionally appeared in numbers in Britain and especially in 1938, 1947 and 1952. Migration records (Table 4E of the South Eastern Union of Scientific Societies supplement) show only one other year (1941) when more than fifty moths were recorded since 1930. Abroad the species has an astonishingly wide distribution from the Americas to China and Australia and in these warmer climates it may become a pest of agriculture; in the tropics I am told it can grow from egg to pupa in ten days. In Britain, as in other parts of northern Europe, it seems to be unable to pass the winter months or even to breed freely enough during the summer to build up large autumnal broods. R. F. Bretherton (1957, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1955: 123) records wild larvae found on *Persicaria* in early October 1952 and suggests that the species breeds, in some years at least, in Surrey. But for the main part, breeding wild in this country is still only presumed, however probable.

There are records of the moth from most parts of Britain as far north as the Hebrides and they have mostly occurred in August and the autumn; but there were a couple in February 1950 and more in 1958 and a good many in March 1952 with others in March 1955 and 1957 and there are records throughout the early summer as well.

To Mr. Austin Richardson I am indebted for the chance to rear this species on a large scale, the moths being caught by him in the Scilly Isles in August 1958. The eggs hatched on 24.viii.58 and pupation began on 16.ix.58; newly hatched larvae were at first yellowish and became in turn dull green and blackish olive with a pale yellow spiracular stripe.

Description of the last instar larva. Length to 30 mm. The shape dumpy, plump, narrower at the thoracic rings becoming gradually fuller until the 7th-8th abdominals, cylindrical, the rings well differentiated with only narrow folding between them. The cuticle smooth and very thin with only the sparsest of fine short hairs from minute tubercles. The head rounded, flattened in front, dappled towards the top, smooth and shining but set with numerous stiff bristles, dark brown to olive, darker on the lobes, even blackish at the sides. Prothoracic plate weak, squared, crossed by the fine whitish dorsal stripe and rather broader subdorsals. Anal plate soft and ill-defined. Spiracles white-centred

oval black rings placed at the centre of a pale cushion along the fine sinuous spiracular line, the last pair much the largest.

There are two principal forms, a darker striped one and a plain green one, but there are numerous variations linking them.

The usual dark form has a pinkish broad dorsal area etched in little wriggling, longitudinal reddish lines along the abdomen. The lateral space filled with dark purplish brown, again composed of minute irroration and paling towards the spiracular band which on the abdomen is yellowish, tinged and flashed with orange and which is edged above by a fine black wavy line. There is a white dot that stands out boldly on each of the abdominal segments. The whitish subdorsals much clouded with reddish along the abdomen. Spiracular stripe is whitish and bolder on the thorax. The pale dorsal stripe is mostly open (i.e. not pinched across and so is unbroken at the intersegmental divisions) and bounded by a narrow dark-brown line that ends on the eighth abdominal ring.

The green form has a simpler pattern, having the dorsal stripe weakly dusted in olive green across the back of each ring and loosely joined across to a broader lateral band of the same colour. The subdorsal lines are reduced to the slight division of colour between dorsal and lateral spaces. A weak black crinkly line at the upper edge is all that remains of the spiracular band but each spiracle is set in a warm reddish or pink patch. All legs olive green, tipped with pinkish crochets.

Each of these major forms may be decorated along the dorsum by black freckling and subdorsal streaks along the abdominal rings, better marked on the 6th-8th. Amongst the dark banded forms some are so heavily clouded with velvety black along the sides that the spiracular line and associated patch show up with great clarity. In others the black mottling takes the form of lateral dappling, alternating with patches of fuscous ochreous. In these darker examples the dorsal line is much obliterated and dark wedges appear at the intersegmental folds.

Green forms vary from bright yellowish to deep olive.

This larva has nothing in common with the true *Caradrina* but rather shows the characters of *Hadena*, and I would place it nearer to *Discestra trifolii* Hufn. (*H. trifolii* Rott.); certainly it would be more realistically grouped with the *Hadeninae*.

Figures—Pl. IX, figs. 1-5, all last instar, 29 days old, reared on dandelion *ab. ovis* Tresco, Scilly Is. 22.ix.58.

Cirrhia ocellaris Borkh. Pale-lemon Sallow.

Numerous accounts of the occurrence and habits of this noctuid in Britain have been given since the original discovery in 1893 at Wimbledon, Surrey (there was earlier mention of two Brighton captures in 1858, recorded in 1858, *Ent. Weekly Intelligencer*, but these appear to have been discounted by most authors). The present distribution is known to extend over the greater part of East Anglia in pockets northwards from the Surrey and Thames valley stations to the east coast, to



Figs. 1-5, *Laphygma exigua* Hubn. ($\times 1\frac{1}{3}$ approx.)

Figs. 6-8, *Cirrha ocellaris* Borkh. ($\times 1\frac{1}{2}$ approx.)

north Norfolk and westwards to Huntingdonshire and Cambridgeshire; within that region there are well-known centres where the species may be collected in plenty, especially in the larval stage. Outside East Anglia the moth has been recorded once from Bognor, Sussex (in the year following the first British capture) and by Meyrick (1927, *Revised Handbook of British Lepidoptera*, p. 122) for Gloucestershire; the Anglesey record (1950) was withdrawn by the recorder, K. C. Greenwood (1950, *Entomologist*, **83**: 60).

Of the many contributions to our knowledge of this species, that given by F. Stanley-Smith (1937, *Proc. S. Lond. ent. Nat. Hist. Soc.*, **1936-7**: 73-79) is one of the most complete, while the more recent summary by H. C. Huggins (1953, *Ent. Rec.*, **65**: 347-8) is also especially useful.

The insect passes the winter in the egg which is laid on or very near to the large poplar buds; the larva feeds at first in the expanding buds and catkins but the manner in which subsequent growth is made is still not exactly known although it has been the subject of some speculation and scrutiny. What is certain is that by gathering both newly-shed buds and catkins from beneath Italian Black Poplars in late spring the tiny larva can be collected in great quantity. Mr Stanley-Smith records the finding of small and half-grown larvae, the former in bud sheaths on the ground, the larger ones between layers of old dead poplar leaves or between them and the soil. He argues that small larvae in the wild state might "desert the catkins before they drop and bore into the high leaf buds. Against this is the fact that in the early stages they seem rather to prefer catkins to leaves, so long as the former could be supplied". Mr. Huggins suggests that the larvae might spin up in the expanding shoots on the tree until the last instar and then drop to the ground, to complete their feeding by crawling up the tree each night. The most widely held opinion is that the small larvae drop with bud scales and catkins, and spend the rest of their days foraging in litter beneath the trees and eating a great variety of low-growing plants in addition to any suitable poplar debris.

When reared in captivity larvae will eat plants such as dandelion, chickweed and groundsel but they always prefer poplar leaves. Stanley-Smith quotes Mr. Worsley Wood for the following foodplants—elm, willow, aspen, apple, plum, red currant and raspberry, while he himself found the larvae took readily to privet. Worsley Wood said that Treitschke had gathered wild larvae from *Artemisia campestris* L.

Times for collecting larvae depend on the state of leafing of the variety of poplar, the particular season and the locality; in 1951 I collected some on 6th May and in 1957 at the same place on 13th April. The larvae feed up very quickly in captivity, becoming fully grown in three to four weeks, but tiny larvae will appear throughout that period from the original catkins as if successive hatchings were taking place. Like other species of this genus and its allies, the larva of *C. ocellaris* lies unchanged in a tight earthen cocoon for upwards of two months before pupating.

Description of fully-grown larva. Length to 30 mm., of the characteristic *Cirrhia* build, with thoracic rings much the smaller, cylindrical, the rings distinct, abrupt taper at the last abdominal to small and weak claspers, the skin soft and velvety.

Colour a deep purplish-brown composed of minute dense freckles on a paler ground. A weak very fine pale dorsal line, deeply edged and much suffused by blackish-brown, totally obliterated at the anterior part of the segment and diffused laterally to form an obscure diamond, the posterior angle of which is better defined by two oblique arms that reach to the subdorsal. On rings 10 and 11 the diamond is broken into a W formation, the centre of which is filled with dusky shading. Subdorsals, a series of very delicate short dark streaks, joined to the dorsal line by the oblique arms of the diamond. Spiracular band very pale, inclined to whitish but much mottled and diffused into greyish ochreous; a darker patch surrounds each spiracle, placed immediately above the spiracular band. Spiracles very thick black ovals, placed centrally on the segment.

Prothoracic plate deep black, semicircular, weakly notched on the posterior margin, crossed by an exceedingly fine dorsal line and very clear white subdorsals. Anal plate blackish, crossed by strong white subdorsals. Head orange-brown with darker reticulation and two dark vertical stripes in front that edge the clypeus.

There is some variation in the intensity of markings along the dorsum. Some larvae may have well etched diamonds while in others the pattern may be extremely weak.

The only similar larvae I have encountered whilst collecting *C. ocellaris* from poplar litter have been *Agrochola macilentata* Hübn. and *A. circellaris* Hufn.; the former is easily distinguished by its more rosy colour and series of stark white streaks along the dorsum; *A. circellaris* has a pale-greyish ground colour with a series of very clearly marked spade-shaped patches along the dorsum.

The larva of *C. ocellaris* is indistinguishable from those of *Citria lutea* Stroem and *Cirrhia icteritia* Hufn., but neither of these appears to frequent poplar in the usual way although P. B. M. Allan (1949 Larval Foodplants) records the first named as doing so. I have never had either from the enormous quantities of material collected in Suffolk.

Figures—Pl. IX, figs. 6-8, all last instar, collected when small from fallen Italian Black Poplar catkins and leaf scales. Mildenhall, Suffolk, 4.v.57.

Leucania favicolor Barrett. Mathew's Wainscot.

Doubt has often been cast on the specific distinctness of this insect since its discovery in 1895 and its description by Barrett in the following year. As recently as 1952 (*Ent. Rec.*, 64: 257-8) A. H. Sperring, who is well acquainted with the moth at Hayling Island, Hants, suggested that it was best treated as a subspecies of *L. pallens* L. and stated that as a rare event he had found both insects in cop.; and Beirne (Origin and History of the Brit. Macrolepidoptera; 1947, *Trans. R. ent. Soc. Lond.*, 98: 305) has no doubts at all that *favicolor* is a subspecies that has "...

probably developed as a result of the isolation of a population of the species in the Dogger Land region . . .". Certainly the morphological differences between *favicolor* and *pallens* are slight, but to my mind they are at least as convincing as the slender evidence that distinguishes the "genitalia species" and indeed more compelling than the delicate separation of *Diarsia florida* Schmidt from *D. rubi* View. There is rarely much difficulty in separating the moths of *favicolor* from *pallens* for the lovely rufous, buff and yellow variations are never to be found in *pallens*; the fresher the insect the more striking the soft silky sheen of *favicolor* in all its forms. It is true that Pierce (1909, *Genitalia of the Group Noctuidae of the Lepidoptera of the British Islands*, p. 27) could find no difference in the male genitalia except in size, but in his second volume (1942, *Genitalia of the Group Noctuidae of the Lepidoptera of the British Islands*, p. 21) Pierce recorded slight differences in the female organs; Sperring (*loc cit.*) said the only distinction he could find were the more numerous cornuti of *favicolor*. Cockayne (1952, *Ent. Rec.*, **64**: 220-1) wrote that a chromosome count of both species proved both to have the same number, but that this condition was well known in other more obviously separated species.

So far as its distribution in this country is concerned, its western extent is still only to Christchurch, Hants, and it has long been known from Hayling in addition to the original Suffolk and Essex stations and along the north Kent coast. Robin Mere took a moth at Chiddingfold, Surrey, in 1952 but thinks it might have been accidentally transported; it is the only inland occurrence.

Description of the fully grown larva. The largest measure to rather over 40 mm. long, and have the usual plump cylindrical shape of *Leucania*. General colour a warm pinkish brown, dusted so finely with grey along the dorsum as to merge smoothly into the rosy outer shade. Paler beneath, a soft ochreous pink or stone colour. There is a fine white dorsal line bounded by a broad belt of greyish brown, then a narrow stripe of pinkish and a dark edging to the thin white sub-dorsal; immediately below this there is a pale pink band finely bordered above and below in reddish orange, then a whitish line that immediately surmounts the conspicuous broad band of slate grey, followed below by a band of similar width of pale stone colour. The spiracles are situated where these bands meet. Below the pale band the skin retains a similar pinky stone colour. There is a row of small dark dots along the ventral line on each of the second to sixth abdominal segments, and another at the intersegmental fold of the metathoracic and first abdominal segments.

Head pale brown, marked with two brown vertical stripes on the lobes, mouthparts darker. Thoracic legs suffused with greenish, prolegs and claspers pale pinky brown. Prothoracic plate weak, yellow brown, crossed by clear white dorsal and subdorsal lines. Spiracles pale centred, deeply black ringed.

In the wild it is thought to feed on *Puccinellia maritima* (Huds.) Parl. and other grasses of the salt marshes, but in captivity it is usually reared on *Dactylis* and is mostly forced through in the autumn; it is easy enough to collect wild at Hayling in May.

Figures—Pl. X, figs. 1-3, last instar, reared *ab. ovis* on *Dactylis*, Hayling Island. 22.viii.53.

Leucania l-album L. White L Wainscot.

Whereas the first British specimen was taken in 1901, it was not until 1933 that it was found in numbers in Britain: to-day it is known to have a broken distribution along the south-west English coastline from the Isle of Wight to Cornwall and according to Dr. de Worms (1957, *Proc. S. Lond. ent. Nat. Hist. Soc.*, 1956: 99) also in South Wales.

Like some others of the genus this larva is rarely recorded in the wild and our knowledge of the early stages is based chiefly on material bred from the egg, being forced through during the early winter, but F. H. Lees (1952, *Ent. Rec.*, 64: 101) records that Mr. P. P. Milman found wild larvae.

The full life-history is given by Cockayne in (1938, *Ent. Rec.*, 50: 13-18), from which the following description has been taken.

Description of the last instar larva. "Head yellowish-brown marked with brown only slightly darker; on each lobe is a broad vertical line running down on each side of the clypeus, and external to this is another line in front and two lateral lines. Between the two lateral lines are two faint vertical lines with side branches forming a reticular pattern, a single similar line runs between the inner lateral line and the line down the middle of the lobe, and another between this and the innermost and darkest line. The outer edge of the labrum is dark brown. Pattern, from the dorsum to venter — There is a thin white dorsal line with a dark brown line just external to it, then an ochreous stripe, covered with many broken wavy lines of dots, and bordered by a darker and more complete line, just inside which lie the anterior trapezoidal tubercles, then a stripe of bright ochreous ground colour. Next comes a rather broad brown stripe, at the inner edge of which lie the posterior trapezoidals. In one form of larva this is uniform in colour throughout, in another form on each somite from the metathoracic onwards that part of the stripe in front of the posterior trapezoidal is black or very dark brown, but intermediate forms occur. The rarest, as in *albipuncta*, is the form with no darkening of the stripe.

"Outside this is a narrow ochreous stripe, then a narrow brown line, then a slightly broader ochreous stripe, then a narrow grey-brown stripe, then a narrow greyish-white stripe, then a broader grey-brown stripe, touching the external edge of which are the supraspiraculars. Next is a pale ochreous stripe, then a narrow red-brown line, then a



Figs. 1-3, *Leucania favicolor* Barrett ($\times 1\frac{1}{4}$ approx.)

Figs. 4-6, *Arenostola brevilinea* Fenn (approx. natural size).

Figs. 7-9, *Leucania l-album* L. (approx. natural size).

very pale ochreous stripe, and then a grey-brown band above the legs and prolegs. The whole surface is irrorated with fine wavy lines of dots. The pale lines run across the prothoracic plate and there the white dorsal line is widest. The spot on the mid-ventral surface of each abdominal somite is pale red-brown and very inconspicuous. The skin is very thin as in *faricolor* and *pallens*, thinner than in most *Leucanias*, and this accounts for the wet appearance noticed by Wightman and for the pale red intersegmental lines noticed by Wynn. The larva, when full grown, is more slender than that of *albipuncta*, and the head is yellower and smaller and the colour is redder in tone . . . Length 32-33 mm."

Figures—Pl. X, figs. 7-9, last instar reared *ab. ovis* from Torquay parent taken by G. E. Hyde, reared on *Dactylis* 12.viii.53.

Arenostola brevilinea Fenn. Fenn's Wainscot.

Fenn's Wainscot is still confined in Britain to the broads district of East Anglia with its most southerly stations at Southwold and other Suffolk records from Fritton and Barnby (*Cat. Lep. Suffolk*, 1937).

The larva feeds within the stems of reed until the last instar, boring into the upper part of one of the smaller stems; it behaves rather like *A. phragmitidis* Hübn. but moves more often from stem to stem and chooses the more slender, less dominant ones. It has the habit of extruding its frass from the entrance hole and, although the larva is restless when out of its stem, I found it would move about its fen habitat freely enough by day so that changing from stem to stem may be done then as well as at night. After the last moult reed leaves are eaten but the larva still bores into stems to hide away during daylight. It is fully-fed by the third week of June. Pupation is passed in a loosely-spun cocoon placed outside the stem amongst fen litter, like *A. phragmitidis*.

The habitat is like that favoured by *Rhizedra lutosa* Hübn., not the densest and most vigorous reed beds but instead the sparser, more stunted and open wastes at fen margins; it particularly seems to like reeds that are cut over at intervals and it likes them best a couple of years or so after cutting.

There are several descriptions of the larva given by British authors, but few are comprehensive: there are no good illustrations available, even those given by Barrett (1899, *Lep. Brit. Is.*, V, Pl. 200, fig. 1d) are quite poor.

Description of the last instar larva. Length to 35 mm. The shape very cylindrical, a little flattened along the dorsum, abdominal segments rather longer than broad, little constriction or folding between them but with much lateral crinkling of the spiracular flange.

Basically the larva is a coarse orange-brown colour but so heavily dusted with grey and blackish above the spiraculars that the dorsum appears a uniform dusky olive-grey with the skin greasy-looking, and much wrinkled transversely. Dorsal and subdorsal stripes of equal width

and running from behind the prothoracic plate to the anal plate, being of the orange ground colour but centred with a finer line of more reddish, and being pinched at the intersegmental divisions.

Spiracular band broad, undulating, bright primrose-yellow, edged immediately above and throughout by a narrow blackish band. Below the spiraculars the body is a uniform pinkish-brown, inclined also to some degree of greenish ochreous depending on the age of the larva.

Prothoracic plate weak, greyish, bearing two pairs of tiny black tubercles at the centre and with a group at each side, the plate crossed by a weak pale dorsal line. Anal plate pale brown, crossed by narrow pale dorsal and subdorsals. Dorsal tubercles very tiny, black. Spiracles small, oval, black, weakly centred with paler, placed at the centre of the band on each abdominal segment except the last pair which are above it. Head flattened in front, pale brown, shining, darker mouth-parts. True legs pale greyish-ochreous like the prolegs, but these are well tinged with pinkish towards the crochets.

A. brevilinea has long been a problem to the systematist for the moth shows no real affinity with any well recognised group. It has been joined to various Wainscot genera including *Leucania*, and to-day, while its closest associations may remain in dispute, it is at least held to belong to the *Nonagria-Hydraecia* group rather than to the very different and *Hadena*-like *Leucania*. Pierce found (1909, *Genitalia of the Group Noctuidae of the Lepidoptera of the British Islands*, p. 36) (1942, *ibid.*, p. 23) that the male genitalia accorded with the *Hydraecia* form, but the female rather with *Nonagria*. The unbeaked pupa is of the regular noctuid form, being placed in a very different resting place from those of *Nonagria*. The larval habits are similar to those of *A. phragmitidis* but the larva itself is so very different, while neither species has any real claim to belong to the rest of *Arenostola* (formerly and better called *Tapinostola*) which without these two is then tolerably definite. The larva of *brevilinea* has only a superficial likeness to the *Leucania* larva, there being differences in pattern and pigmentation, spiracles and head structure; *brevilinea* is vastly different from the ill-marked weak-skinned and small-headed *Tapinostola* larva, nor has it the obesity and pattern of *Hydraecia*, or the form and head capsule of *Nonagria*. I find the closest parallel to this larva in the true *Apameas* like *A. sordens* Hufn. and *Eremobia ochroleuca* Schiff. and I believe that *brevilinea* occupies much the same position in relation to them as does *Simyra albovenosa* Goeze to the *Acronyctas*.

Figures—Pl. X, figs. 4-6, last instar on *Phragmites*, Catfield, Norfolk, 16.vi.57; fig. 4 soon after last moult.

BOOK REVIEWS

Dragonflies. By Philip S. Corbet, Cynthia Longfield and N. W. Moore. 8½" × 5½", pp. xii and 260, 32 plates (24 coloured), over 200 text figures. London: Collins. New Naturalist Series, No. 41. 1960. Price 42/-.

Much has been written on Dragonflies and this book takes its place amongst the best. One is accustomed to works of a high standard in the New Naturalist Series, and one expects competent workmanship from these authors. The volume reflects credit on both authors and publisher.

All aspects of Odonata are covered: distribution, the egg and egg laying, the larva, emergence, maturation and longevity, behaviour of the adult, dispersal, fossil history, relationship with other animals—and with man, etc.; each chapter clearly indicates which of the three authors were responsible.

One is left with the thought that it is a pity with such a small Order, means of distinguishing imagines is not covered more fully, especially as the excellent work of Mr. A. E. Gardner on the larvae is reprinted, including his superb drawings. This provides the reader with the most up-to-date information on the determination of larvae whilst Miss Longfield's chapter on the British species does not cover the determination of imagines nearly so thoroughly. Keys, it is felt, could have been included without extending the work too much. Thus we have the situation in which the imagines, which the non-odonatist is more likely to encounter than the larvae, are dealt with in a more casual manner.

Distribution is covered from world-wide aspect and figures show the circumboreal distribution of some of our species. British distribution is shown by a series of small maps (four to a page) which give adequate information for a work of this character.

The chapter on Fossil History gives a fine account of the antecedents of the Order, an aspect frequently overlooked in other Orders, though of course the fossil evidence is seldom so plentiful as in the dragonflies.

Understandably, with several authors involved the standard of the figures varies; most are of a high order, indeed, and all adequately suit their purpose. It is unfortunate that the eggs have been neglected in this respect. The coloured plates, which perhaps go a considerable way towards selling a book of this kind to the general naturalist, are a mixed bag. Some, such as plate 10, are as good an example of top-quality colour printing as one can find; others, like plate 3 (particularly figs. a, b and d) are so poor that they could well have been omitted. In between these are instances, plate 9 for example, which in this copy is too green, but may vary from copy to copy, particularly as the blue plate in this case is a little out of register.

Appendices, in addition to Mr. Gardner's *Key to the larvae of the British Odonata* covering 33 pages, includes one on venation, another on methods for preserving colours and one on marking living specimens for movement studies. An excellent list of references provides a source from which all the information that the general naturalist, and others beginning the study of these insects, require can be obtained.

A first-class work—and not too expensive at forty-two shillings.

F. D. B.

Hydrophilidae Europae. By Dr. Aldo Chiesa. 9½" × 6½", pp. 199, 325 text figures. Bologna, Senola Graphica Salesiana.

This work, in Italian, is a series of dichotomous keys for the determination of the hydrophilid Coleoptera of Europe, and includes some distributional information with a heavy Italian bias. All our species are included but they form only a small part of the entire work. The keys are extensive and cover some most difficult genera, *Helophorus*, *Octhebius* and *Hydraena*, being typical examples. Sub-species and aberrations are included, though in the case of the latter it is very doubtful if many are worth separating by name.

The figures are, unfortunately, extremely crude and a very long way from the accurate entomological drawings we have become used to; which until the work has been used for some time and confidence established will almost certainly raise some doubts in the mind regarding their value. The method of production is puzzling—they look almost as if drawn direct onto an offset plate in an attempt to reduce costs.

For some reason, unknown to your reviewer, the index is not in alphabetical order but in page order. One would expect the object of an index to be to enable one to find things quickly in the text—this one is little quicker than searching through the pages. A pity, because though it does not rob the work of any of its basic value, it makes it very irritating to use.

Keys of this nature are very valuable because they include those species most likely to occur with us and with such close and complicated genera as we have in this family it is possible that some may have been overlooked.

A work for the specialist, but one which the general Coleopterist should keep in mind.

F. D. B.

Land and Water Bugs of the British Isles. By T. R. E. Southwood and D. Leston. London: Frederick Warne & Co., Ltd. 436 pp., 63 plates (32 in colour) and 153 text figures. 30/-.

This welcome addition to Warne's *Wayside* and *Woodland* series deals with all the British Heteroptera. There is a brief introductory chapter, after which each family and the species it comprises are described. The space allotted to each species varies from only four lines to over two pages; this probably reflects the state of our

knowledge. One of the most useful features of the book is the keys, at family, genus and species level. On the whole, these work very well, although, of course, the 'difficult' genera, such as *Orthotylus* and *Psallus* are not easy to key simply. In marked contrast to Messrs Warne's recent work dealing with the Coleoptera the authors are clearly right on top of the literature, both British and foreign, and there is a very full list of references at the end of each chapter. Occasionally one wonders whether the Continental literature is not stressed too much; for instance, *Malacocoris chlorizans* (Panz.) is said to be double-brooded, on the authority of the Swiss Geier and Baggiolini, ignoring the work of Collyer in this country which clearly indicates that this species is single brooded here, hatching six weeks later than in Switzerland.

In a work of this size there are bound to be some errors, though these are few. On plate 43 the captions to *Lygus pratensis* and *L. rugulipennis* have been transposed.

Despite the statement on p. 68 there is no doubt that *Erodium* is one of the hosts of *Corizus hyoscyami* (L.) in this country.

Taphropeltus hamulatus (Thom.), treated here as doubtful (p. 134), is now thought to be a good species.

The complete absence of synonyms in the book makes it very difficult to use in conjunction with other works. Surely even a short synonymy is more important to the average reader than the chromosome numbers, which are given for many of the species?

The book is particularly well illustrated with very many good line drawings and 32 fine coloured plates by the late H. D. Swain.

A useful appendix on collecting methods and a glossary complete the work.

This excellent and relatively inexpensive work should provide a stimulus to even greater activity in studying the British Heteroptera; it can be thoroughly recommended, and for the Hemipterist, whether a beginner or experienced, it is a "must".

M. G. M.

The Buzzard. By Frank Wenzel. 86 pp. Demy 4to. George Allen and Unwin Ltd. Price 35/-.

This delightful work, which is excellently translated from the original Danish by Reginald Spink, tells of the life history of a pair of buzzards in their lakeland haunts in Denmark. The author took great trouble to go into every aspect of their breeding and nesting habits by constructing a hide quite close to the nest in a high tree. From this he took some amazing photographs with which the book is amply illustrated. Some of these, in colour, show the parent birds in their forest and water background; while others illustrate the gradual development of the chicks from the hatching of the eggs. There are many photographic studies of them and their parents in several positions, including some remarkable silhouettes taken at dusk.

Besides this particular pair of fine birds, the author remarks on many others he has had contact with; quite 100 in all. He makes a critical analysis of their respective habits and nesting sites. A good deal of space, too, is devoted to the types of prey brought to the nest by the adult birds, of which the female only incubates.

Few birds, especially among the Raptores, have been so comprehensively treated. This monograph, which is most clearly printed, with its first rate photographs makes most entertaining reading. It is indeed a valuable addition to ornithological literature.

C. G. M. DE W.

ERRATA—1957 Vol.

Page 26, line 7, "on the Camber Peninsula" should read "on the Gower Peninsula".

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1960

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December 1961



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- 1942 BANNER, JOHN V., M.R.C.S., L.R.C.P., F.R.E.S., "Wykehurst," 41,
Varndean Gardens, Brighton 6, Sussex. *l.*
- 1958 BARHAM, C. S., B.S.C., 19, Westbury Road, Ipswich, Suffolk. *c.*
- 1948 BAXTER, L. N., 16, Bective Road, Forest Gate, London, E.7.
l. breeding.
- 1948 BAXTER, R. N., 16, Bective Road, Forest Gate, London, E.7.
l. breeding.
- 1933 BAYNES, E. S. A., O.B.E., F.R.E.S., 2, Arkendale Road, Glenga-
geary, Co. Dublin, Eire. *l.*

- 1954 BEAUFOY, S., B.SC.(ENG.), A.M.I.E.E., F.R.P.S., F.R.E.S., 98 Tuddenham Road, Ipswich, Suffolk. *ent.*
- 1957 BEESLEY, W. N., M.SC., F.R.E.S., 26, The Grove, Addlestone, Weybridge, Surrey. *d.*
- 1949 BELL, C. L., F.R.E.S., 77, Mayfield Road, Sanderstead, Surrey. *l.*
- 1960 BERNHARDI, Dr. G., Labor d'Entomologie Museum Paris, 45bis Rue de Buffon, Paris Ve. *l. rhop.*
- 1947 BEST, A. A., 131, Woodham Lane, New Haw, Weybridge, Surrey. *l.*
- 1960 BICKNELL, M. R., St. Anthony's Avenue Road, Fleet, Hants. *l.*
- 1949 BIRKETT, NEVILLE L., M.A., M.B., B.CHIR. (CANTAB.), 3, Thorny Hills, Kendal, Westmorland. *l, c, d.*
- 1949 BLATHWAYT, C. S. H., M.A. (OXON), F.R.E.S., "Amalfi," 27, South Road, Weston-super-Mare, Somerset. *l.*
- 1948 BLAXILL, A. D., "St. Marthas," Braiswick, Colchester, Essex. *l.*
- 1926 BLISS, A., "Golden Mist," Whitford, near Axminster, Devon. *l.*
- 1960 BLOKKEY, Air Vice Marshal P. S., C.B., C.B.E., B.A., Vanfold, Fernhurst, Haslemere, Surrey. *l.*
- 1959 BLUNT, W. H., 106, Bardesley Green, Birmingham, 9. *ent.*
- 1925 BLYTH, S. F. P., 6, Hatherley Road, Winchester, Hants. *l.*
- 1948 BOLINGBROKE AND ST. JOHN, THE VISCOUNTESS (née FROHAWK, Valezina), Old Toll House, Pulborough, Sussex. *nat. hist. ent.*
- 1948 BOLTON, E. L., Lyncombe, Stagbury Avenue, Chipstead, Surrey. *l.*
- 1948 BOWATER, Lt.-Col. W., M.C., B.D.S., T.D., D.L., 41, Calthorpe Road, Edgbaston, Birmingham, 15. *l, heredity.*
- 1944 BOWDEN, S. R., B.SC., A.R.C.S., F.R.E.S., 53, Crouch Hall Lane, Redbourn, Herts. *l, g.*
- 1946 BOYCE, B., 16, Highland Road, Chichester, Sussex. *l.*
- 1948 BOYES, J. D. C., B.SC., A.R.I.C., A.R.P.S., Wimborne, Millfields, Nantwich, Cheshire. *l.*
- 1960 BRADFORD, E. S., 124 Upper Street, London, N.1. *ent, ml.*
- 1946 BRADLEY, J. D., F.R.E.S., Council, 53, Osterley Road, Isleworth, Middx. *l.*
- 1947 BRETHERTON, R. F., C.B., M.A., F.R.E.S., Ottershaw Cottage, Ottershaw, Surrey. *l.*
- 1933 BRETT, G. A., B.SC., A.R.C.S., D.I.C., F.R.E.S., 2, Claygate Lane, Hinchley Wood, Esher, Surrey. *ent.*
- 1958 BRIDGES, Lt. Col. H. C., Berisal, Ashford Road, Challock, Kent.
- 1930 BROOKE, Miss W. M. A., F.L.S., Greenglade, Malvern Road, Liss, Hants. *ec, ent, b, marine life.*
- 1954 BROWN, F. C., F.Z.S., 6, Osmond Gardens, Wallington, Surrey. *Giant Silk Moths.*
- 1961 BRUCE, C. G., 16, Harland Road, S.E.12. *l, orn.*
- 1952 BRUSH, H. J., 3, Oakdene Road, Bookham, Leatherhead, Surrey. *ent.*

- 1936 BUCK, F. D., A.M.I.P.T.G.M., F.R.E.S., *Hon. Editor*, 36, Besant Court, Newington Green Road, London, N.1. *c*.
- 1955 BUCKLER, H. A., Sutton Bassett, Market Harborough, Leics. *l, ml*
- 1958 BURGESS, Gp. Capt. L. W., B.A., "Knoleforth", 1, Brittons Cottages, North Weirs, Brockenhurst, Hants. *l*.
- 1946 BURKHARDT, Col. V. R., late R.A., D.S.O., O.B.E., 86, Main Street, Stanley, Hong Kong. *l*.
- 1944 BURNS, B. S., 2, Mead Way, Fareham, Hants. *l*.
- 1948 BURTON, P. J., L.D.S., R.C.S.ENG., F.R.E.S., "Paysanne," Godshillwood, near Fordingbridge, Hants. *l*.
- 1938 BURTON, R. J., L.D.S., R.C.S.ENG., Dinky Cottage, 4, Stanway Road, Stanton, nr. Broadway, Worcs. *l*.
- 1953 BUTTERFIELD, A. W., 124, Ashville Road, Leytonstone, London, E.11. *l*.
- 1951 BYERS, F. W., 59, Gurney Court Road, St. Albans, Herts. *l*.
- 1948 CALDERARA, P., A.M.I.E.E., "Stratton Lodge", 26, Manor Road, Barnet, Herts. *l, c*.
- 1957 CAMPBELL, A. M. G., M.A., D.M., F.R.C.P., 79, Pembroke Road, Clifton, Bristol, S. *ent*.
- 1945 CARLIER, STUART E. W., F.R.E.S., 6, Warwick Buildings, Warwick Road, Solihull, Warwickshire. *l, c*.
- 1950 CAROLSFELD-KRAUSE, A. G., Slotsherrens Have 97, (Kobenhavn)-Vanlose, Copenhagen, Denmark. *l*.
- 1956 CARTER, C. I., Forest Research Station, Alice Holt Lodge, Farnham, Surrey. *ent. arachnology*.
- 1946 CARTER, R. A., M.A., M.B., M.R.C.P., F.Z.S., "The Chestnuts", Old Church Road, Water Orton, nr. Birmingham. *c*.
- 1959 CARTER, Lt. Col. W. A. C., Briarfields, Sandels Way, Beaconsfield, Bucks. *l*.
- 1946 CHALMERS-HUNT, J. M., F.R.E.S., St. Teresa, Hardcourts Close, West Wickham, Kent. *l*.
- 1956 CHATELAIN, R. G., 65, East Drive, St. Mary Cray, Kent. *l*.
- 1958 CHIPPERFIELD, H. E., F.R.E.S., 27, Chilton Avenue, Stowmarket, Suffolk. *l, hym, c*.
- 1952 CHRISTIE, J., 137, Gleneldon Road, Streatham, S.W.16. *d*.
- 1945 CHRISTIE, L., *Lanternist*, 137, Gleneldon Road, Streatham, S.W.16. *ent*.
- 1954 CLARK, J., 7, Park Road, Bognor Regis, Sussex. *ent*.
- 1951 CLARKE, C. ASTLEY, M.D., F.R.C.P. (Lond.), High Close, Thorsway, Caldý, Cheshire. *l*.
- 1936 CLASSEY, E. W., F.R.E.S., 22, Harlington Road East, Feltham, Middlesex. *l*.
- 1960 CLEGG, J., The Educational Museum, Haslemere, Surrey. *aquatic insects*.
- 1934 COLE, G. A., M.A. F.C.A., Abinger Manor Cottage, Abinger Common, Dorking, Surrey. *l*.

- 1953 COLERIDGE, W. L., The Gnoll, Bishops Teignton, nr. Teignmouth, S. Devon. *ent, orn.*
- 1946 COLLIER, Major A. E., M.C., B.A., F.R.E.S., Lynher, Horsham Rd., Cranleigh, Surrey. *l.*
- 1960 COLLINS, M., 27, Finsen Road, Ruskin Park, London, S.E.5. *l.*
- 1960 COLLINS, M. S., 27, Finsen Road, Ruskin Park, London, S.E.5. *l.*
- 1936 COOPER, B. A., B.Sc., A.R.C.S., F.R.E.S., Entomology Dept., Shardlow Hall, Shardlow, Derby. *c (Elateroidea), ecology, ec. ent, l, nat. phot. (Life Member).*
- 1947 CORNELIUS, J. A., B.Sc., A.R.I.C., 15, Ringmore Rise, Forest Hill, London, S.E.23. *l.*
- 1922 COUCHMAN, L. E., F.R.E.S., 35, Browne Street, West Hobart, Tasmania. *l.*
- 1918 COURT, T. H., F.R.G.S., "The Pingle", Mill Road, Market Rasen, Lincs.
- 1947 COX, W. A. A., 65, Bamford Road, Bromley, Kent. *ent.*
- 1950 COXEY, S., "Balcombe", 109, Regent Road, Bolton, Lancs. *l.*
- 1953 COXON, G. F., "The White Cottage", Weald, Sevenoaks, Kent. *ent, nat. hist.*
- 1960 CRAMP, A. C., 11, Craigton Road, Eltham, London, S.E.9. *arach.*
- 1960 CRAMP, J. K., 60, Stillness Road, Forest Hill, London, S.E.23. *nat. hist.*
- 1937 CRASKE, R. M., The Old Court House, Battle, Sussex. *ent.*
- 1918 CRAUFURD, CLIFFORD, "Denny," Bishop's Stortford, Herts. *l.*
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, Northwich, Cheshire. *l.*
- 1947 CRIPPS, C. H., M.A., Bulls Head Farm, Eakley Lanes, Stoke Goldington, Newport Pagnell, Bucks. *l, rh. (Life Member.)*
- 1960 CROSS, D. J., 62, Upper Poole Road, Dursley, Glos. *hym.*
- 1949 CROSS, G. S. E., A.C.T.S.INC., 31, Avenue Road, Finchley, London, N.12. *l.*
- 1932 CROW, P. N., F.R.E.S., c/o Westminster Bank, Ltd., Harpenden, Herts. *l.*
- 1950 CRUTTWELL, G. H. W., Old Ford House, Frome, Somerset. *ent.*
- 1954 CUE, P., "Lhasa," Malvern Road, Ashford, Kent. *ent.*
- 1959 CUMING, N. St. J., 82, Maldon Road, Colchester, Essex. *l, c.*
- 1947 CUNNINGHAM, D., M.A., 42, Rae Street, Dumfries. *l, flora.*
- 1937 CURTIS, A. E., F.R.E.S., "The Cottage," Ifold Estate, Loxwood, Billingshurst, Sussex. *l.*
- 1946 CURTIS, W. PARKINSON, F.R.E.S., M.S.B.E., Ladywell Cottage, Tower Road, Branksome Park, Bournemouth, Hants. *l.*
- 1956 DACIE, J. V., M.D., 10, Alan Road, Wimbledon, S.W.19. *l.*
- 1951 DALY, D. W., P.O. Box 1670, Salisbury, Southern Rhodesia. *ent.*
- 1927 DANBY, G. C., 11, Devon Road, Cheam, Surrey. *l.*
- 1956 DAVIDSON, W. F., F.G.S., 9, Castlegate, Penrith, Cumberland. *l, c.*
- 1951 DAVIS, G. A. N., M.R.C.S., L.R.C.P., Holt Wood, Aylesford, Kent. *l.*

- 1933 DEMUTH, R. P., M.A., L.R.I.B.A., "Watercombe House", Waterlane, Oakridge, Stroud, Glos. *l*.
- 1930 DENVIL, H. G., F.R.E.S., F.R.H.S., *Council*, 4, Warwick Road, Coulsdon, Surrey. *l, c*
- 1947 DEWICK, A. J., Curry Farm, Bradwell-on-Sea, Southminster, Essex. *l*.
- 1958 DILLON, T. J., 4, Alleyn Crescent, West Dulwich, London, S.E.21. *l*.
- 1945 DIXON, C. H., Northbrook Farm, Micheldever, Hants. *ent*.
- 1958 DOLLIMORE, G. F., Willerby, Ashley Park Estate, St. Ives, Ringwood, Hants. *l*.
- 1961 DOLLING, W., 61, Rede Court Road, Strood, Rochester, Kent. *hem.-heteroptera, c*.
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading, Berks. *l*.
- 1960 DOUETIL, B. N., Chalfont, Waynelete Tower Avenue, Esher, Surrey. *Insect phot, d*.
- 1958 DOWNES, Cdr. A. S., D.S.O., R.N., Southways, Montserrat Road, Lee-on-Solent, Hants. *ent, orn*.
- 1930 DUDBRIDGE, B. J., B.A., c/o The Secretariat, Dar-es-Salaam, Tanganyika. *ent*.
- 1949 DUFFIELD, C. A. W., M.C., J.P., F.R.E.S., Pickersdane, Brook, near Ashford, Kent. *l, c, hem, homoptera*.
- 1956 DUNN, T. C., B.SC., D.T., P.T., The Poplars, Chester-le-Street, Co. Durham. *l, especially ml*.
- 1952 DYSON, R. C., N.D.H., F.R.E.S., 112, Hollingbury Park Avenue, Brighton 6, Sussex. *l*.
- 1937 EASTON, N. T., D.F.H., 25 Blenheim Road, Caversham, Reading, Berks. *l, g, nat. phot*.
- 1960 EBBAGE, I., 51, Cholmley Park, Highgate, London, N.6. *l*.
- 1959 EDMONDS, M. H., 938, Warwick Road, Solihull, Warwicks *ent*.
- 1949 EDWARDS, F. H., Rosecroft, Links Road, Worthing, Sussex. *l*.
- 1945 EDWARDS, G. GRAVELEY, Talbot Croft, St Albans, Herts. *l*.
- 1945 EDWARDS, R. C., Arlesley, Pilgrims' Way, Westerham, Kent. *ent*.
- 1933 ELGOOD, W. S., M.A., North Brink, Wisbech, Cambs. *l*.
- 1961 ELLERTON, H. B., Cherry Hay, Meopham, Kent. *l*.
- 1960 ELLERTON, Capt. J., D.S.O., R.N., Cherry Hay, Meopham, Kent. *l*.
- 1951 ELLISON, ELTON F. D., 60 Heathhurst Road, Sanderstead, Surrey. *l*.
- 1937 EMBRY, B., F.R.E.S., Brocks Ghyll, Newick, Sussex. *l*.
- 1932 ENNIS, L. H., F.C.A., Sandford Lodge, Womersley Park, Guildford, Surrey. *l, orn, b*.
- 1947 EVANS, Miss E., c/o Royal Entomological Society of London, 41, Queen's Gate, London, S.W.7. *nat. hist*.
- 1945 EVANS, L. J., 73, Warren Hill Road, Birmingham 23. *l*.
- 1960 EVE, A., 78, Grosvenor Avenue, Carshalton, Surrey. *c*.

- 1946 FAIRCLOUGH, R., "Blencathra", Deanoak Lane, Leigh, Surrey. *ent.*
- 1947 FARWELL, I. G., F.R.E.S., "Mayfield Villa", Portmore, Lymington, Hants. *l.*
- 1955 FEARNEHOUGH, T. D., A.MET., 13, Salisbury Road, Dronfield, Nr. Sheffield. *l.*
- 1947 FEILDEN, G. ST. CLAIR, c/o Lloyds Bank, Exeter. *ent.*
- 1946 FERGUSON, L. F., L.D.S., R.C.S., "Harley House," Gloucester Road, Teddington, Middlesex. *c.*
- 1940 FFENNELL, D. W. H., Martyr Worthy Place, Winchester, Hants. *l.*
- 1955 FIRMIN, JOSEPH, F.R.E.S., M.B.O.U., 12, Worthington Way, Lexden, Colchester, Essex. *l.*
- 1943 FORD, E. B., M.A., D.SC., F.R.S., F.R.E.S., The University Museum, Oxford. *ent, g.*
- 1960 FORD, R. L. E., F.R.E.S., F.Z.S., Dunkeld, Park Hill, Bexley, Kent. *ent.*
- 1939 FORSTER, H. W., 32, Park Mead, Harlow, Essex. *c.*
- 1915 FOSTER, T. B., "Downlands", 24, York Road, Selsdon, Surrey. *l.*
- 1961 FOX, Dr K. J., B.A., M.B., B.CHIR.(CANTAB), 20, Scotsdale Road, Lee, London, E.12. *l.*
- 1948 FRASER, Lt.-Col. F. C., I.M.S.RETD., M.D., M.R.C.S., L.R.C.P., F.R.E.S., 55, Glenferness Avenue, Winton, Bournemouth, Hants. *od, n.*
- 1948 FRAZER, J. F. D., M.A., D.M., PH.D., F.Z.S., F.R.E.S., Stone House, Harbourland, Boxley, Maidstone, Kent. *rh, r.*
- 1946 FRIEDLEIN, A. F. E., "St. Andrews", 85, Priests Lane, Shenfield, Brentwood, Essex. *l.*
- 1958 FRIEND, M. J., 160, Brockenhurst Avenue, Worcester Park, Surrey. *l, ent.*
- 1951 FROHAWK, Mrs. M. J., Old Toll House, Pulborough, Sussex. *ent, nat. hist.*
- 1959 GARDINER, B. O. C., 43, Woodlark Road, Cambridge. *l.*
- 1947 GARDNER, A. E., F.R.E.S., *Vice-President*, 29, Glenfield Road, Banstead, Surrey. *od, l.*
- 1960 GARFIELD, J., End Cottage, Linden Grove, Gedling, Notts. *l, c.*
- 1952 GARLAND, W. A., 1, Testard Road, Guildford, Surrey. *rh.*
- 1954 GERARD, B. McC., 68, Fern Lane, Heston, Hounslow, Middx. *ent.*
- 1950 GENT, P. J., 3, Irthlingborough Road, Wellingborough, Northants. *l.*
- 1952 GILLMAN, Lt.-Col. H. C. R., M.B.E., R.A., Maddington Manor, Shrewton, Wilts. *ent.*
- 1950 GOATER, B., B.SC., F.R.E.S., 71, Grant's Close, Mill Hill East, N.W.7. *l, orn, b.*
- 1936 GOODBAN, B. S., 99, Lime Grove, Eastcote, Ruislip, Middx. *l.*
- 1957 GOODDEN, R. C., Seafields House, Charmouth, Dorset. *l.*

ELECTION.

- 1935 GOODLIFFE, F. D., M.A., Lord Wandsworth College, Long Sutton, Basingstoke, Hants. *ec. ent, d (Chloropidae), c (Dytiscidae)*.
- 1942 GOODSON, A. L., 26, Park Road, Tring, Herts. *l*.
- 1955 GOOSEMAN, M. P., F.R.E.S., "Lonciera", Bottesford Road, Bottesford, Scunthorpe, Lincs. *l, c*.
- 1961 GOULD, A., Governor's House, Western Heights, Dover, Kent. *ent., orn.*
- 1949 GOULD, A. W., 20 Westbrook Road, Blackheath, S.E.3. *c*.
- 1936 GOWING-SCOPES, E., F.R.E.S., "Oakhurst", Oakwood Road, Crofton, Orpington, Kent. *c*.
- 1961 GREENWOOD, B. M., B.A.(CANTAB.), Middlesex Hospital Medical School, Middlesex Hospital, London, W.1. *l*.
- 1953 GREENWOOD, J. A. C., O.B.E., F.R.E.S., Woodcote, Horsell Park, Woking, Surrey. *l*.
- 1960 GRIFFITH, A. C., Trevorren Hill Road, Haslemere, Surrey. *l*.
- 1953 GRIFFITHS, G. C. D., F.R.E.S., 13, Woodlands Avenue, Finchley, London, N.3. *d (Agromyzidae)*.
- 1957 GROVES, E. W., 3, Richmond Road, Coulsdon, Surrey. *hem, d, hym. ec.*
- 1950 GULLY, J. G., Howells Bank Farm, Ringmer, Sussex. *l*.
- 1955 GURDON, J. B., Furnell House, Frensham, Surrey. *l*.
- 1947 HAGGETT, G. M., F.R.E.S., 1, Torton Hill, Arundel, Sussex. *l, ent*.
- 1953 HALL, D. G., 34, Ellerton Road, Wandsworth Common, London, S.W.18. *c*.
- 1949 HALL, STEWART SCOTT, C.B., M.SC., F.R.A.E.S., 9, Laurel Court, Hawthorne, Melbourne, E.3, Australia. *l*.
- 1955 HALSTEAD, D. G. H., 1, Barry Avenue, Windsor, Berks. *c*.
- 1944 HAMMOND, H. E., F.R.E.S., 16, Elton Grove, Birmingham 27. *l, ent*.
- 1959 HAMMOND, N., 1, Red Lion Court, St. Mary Cray, Orpington, Kent. *arachnology*.
- 1949 HANSON, S. M., F.R.E.S., 11, The Close, Spring Grove Road, Isleworth, Middx. *l (Life Member)*.
- 1948 HARBOTTLE, The Rev. A. H. H., M.A., 6, Ranelagh Grove, St. Peters, Broadstairs, Kent. *l*.
- 1943 HARDS, C. H., F.R.E.S., 40, Riverdale Road, Plumstead, London, S.E.18. *l*.
- 1956 HARDY, D. E., District Bank House, Heswall, Wirral, Cheshire. *l*.
- 1943 HARPER, Comdr. G. W., R.N., F.R.E.S., Neadach, Newtonmore, Inverness-shire, Scotland. *l*.
- 1954 HARPER, M. W., Neadach, Newtonmore, Inverness-shire, Scotland. *l, ent*.
- 1936 HARRIS, W. H. A., "Kemel," Oak Tree Close, Stanmore, Middlesex. *l*.
- 1951 HARRISON-GRAY, M., 14a, Lancaster Grove, London, N.W.3. *Saturniidae*.

ELECTION.

- 1961 HARVEY, D. H., 9, Queen Mary Avenue, Morden, Surrey. *rh.*
- 1953 HARVEY, J. G., S.R.N. (Staff), R.A.F. Hospital, Ely, Cambs. *c.*
- 1961 HAWARD, K., 9, Argyle Road, North Harrow, Middlesex. *ent.*
- 1924 HAWKINS, C. N., F.R.E.S., 23, Wilton Crescent, Wimbledon, London, S.W.19. *l, c, g.*
- 1958 HAXBY, C. R., 4, Windermere Terrace, Bradford, 7. *ent.*
- 1938 HAYNES, R. F., 29, Fairfield Drive, Dorking, Surrey. *l.*
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Instituto Miguel Lillo, Calle Miguel Lillo, 205, Tucuman, Republica Argentina. *l, orn, c.*
- 1960 HAYWARD, R., 41, Suffolk Road, Southsea, Hants. *l.*
- 1954 HEATH, JOHN, F.R.E.S., c/o The Nature Conservancy, Merlewood Research Station, Grange-over-Sands, Lancs. *ml.*
- 1920 HEMMING, A. FRANCIS, C.M.G., C.B.E., F.Z.S., F.R.E.S., 28, Park Village East, Regents Park, London, N.W.1. *l.*
- 1924 HENDERSON, J. L., *Hon. Treasurer*, 6, Haydn Avenue, Purley, Surrey. *c.*
- 1951 HERBULOT, C., 31, Av. d'Eylau, Paris 16e, France. *l.*
- 1954 HERVEY, The Rev. Canon G. A. K., M.A.(OXON.), Great Salkeld Rectory, Penrith, Cumberland. *ent, orn, b.*
- 1945 HESLOP, Mrs E. A., "Belfield," Poplar Road, Burnham-on-Sea, Somerset. *l. nat. hist.*
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., "Belfield", Poplar Road, Burnham-on-Sea, Somerset. *l, nat. hist.*
- 1946 HEWSON, F., F.R.E.S., 23, Thornhill Drive, Gaisby, Shipley, Yorks. *l, hym. parasitica.*
- 1948 HICKIN, N. E., PH.D., B.SC., F.R.E.S., *Council*, Home Farm, Fetcham, Surrey. *t.*
- 1960 HIGGINS, L. E., M.D., Gracieu's Pond Farm, Chobham, Woking, Surrey. *l.*
- 1956 HIGGINS, W. J., Standard Nursery, Old Worthing Road, East Preston, Sussex. *l.*
- 1948 HILLABY, J. D., F.Z.S., F.R.E.S., 85, Cholmley Gardens, London, N.W.6. *ent.*
- 1945 HINTON, H. E., PH.D., B.SC., F.R.S., F.R.E.S., Department of Zoology, Bristol University, Bristol, Glos. *ent.*
- 1949 HOARE-WARD, J. W., Box's Farm, Horsted Keynes, Sussex. *l.*
- 1959 HOCKING, Miss S. K., Imperial College Hostel, Prince Consort Road, London, S.W.7. *ent, arachnology.*
- 1953 HODGKINSON, ALEXANDER, A.R.C.A., 12, Kitson Road, Barnes, London, S.W.13. *l.*
- 1956 HOMER, T. J. G., M.A., A.M.INST.T., Yelton Hotel, Hastings, Sussex. *l.*
- 1950 HONEYBOURNE, T. J., F.R.E.S., "Laceys," 97, Birchwood Road, Wilmington, Dartford, Kent. *l.*
- 1945 HOWARD, A. P., 65 Hale Lane, London, N.W.7. *ent.*

ELECTION.

- 1953 HOWARTH, MRS. HELEN, "Arrochar", Barnet Gate, Arkley, Herts. *l, b.*
- 1931 HOWARTH, T. G., B.E.M., F.R.E.S., F.Z.S., "Arrochar", Barnet Gate, Arkley, Herts. *l.*
- 1934 HUGGINS, H. C., F.R.E.S., 65, Eastwood Boulevard, Westcliff-on-Sea, Essex. *l, ent.*
- 1947 HUMPHREY, S. W., Pear Tree House, Roade, Northamptonshire. *l, rh. (Life Member.)*
- 1957 HURWORTH, P., 10, Linden Grove, Rumney, Cardiff. *rh. c.*
- 1950 HYDE, G. E., F.R.E.S., "Pantiles", Warrington Drive, Bessacarr, Doncaster, Yorks. *l, od.*
- 1950 HYDE-WYATT, B., 108, Lindsay Road, Worcester Park, Surrey. *od, c, l.*
- 1956 IMBER, S. F., 27 Glebe Road, Ashstead, Surrey. *rh.*
- 1953 IVES, Major D. H., R.A., Highbreak, Princes Road, Rhuddlan, Flintshire. *l.*
- 1956 JACKSON, Miss D. J., North Cliff, St. Andrews, Fife. *c, hym. par.*
- 1940 JACKSON, Capt. REGINALD A., C.B.E., R.N., F.R.E.S., Middle Farm House, Codford St. Mary, Warminster, Wilts. *ent, l.*
- 1923 JACOBS, S. N. A., S.B.ST.J., F.R.E.S., *Trustee*, "Ditchling", 54, Hayes Lane, Bromley, Kent. *ml, e.ml.*
- 1955 JACOBY, M. C., Battle Abbey, Sussex. *ent.*
- 1948 JANSON, D. B., 44, Great Russell Street, London, W.C.1. *ent. (Life Member.)*
- 1961 JARMAN, R. A., 182 Blackamore Lane, Maidenhead, Berks. *l.*
- 1960 JARRATT, W. J., Ash Tree Cottage, 111 Dulwich Village, London, S.E.21. *l.*
- 1925 JARVIS, C. MACKECHNIE, F.L.S., 19, Sloane Gardens, London, S.W.1. *c.*
- 1938 JARVIS, F. V. L., B.SC., F.R.E.S., "Corbière", 33, Greencourt Drive, Bognor Regis, Sussex. *l, g.*
- 1947 JAY, E. P. Present address not known. *l.*
- 1951 JEFFERSON, T. W., 37, Riversdale Terrace, Sunderland, Co. Durham. *l.*
- 1948 JEFFS, G. A. T., Nunsholme, Nuns Corner, Grimsby, Lincs. *l, ent.*
- 1958 JENNER, D., Walnut Row, Park Farm, Larkfield, Maidstone, Kent. *ent.*
- 1961 JERRARD, P. C., Belvedere Hotel, 6, Grenville Place, London. S.W.7. *araneae.*
- 1960 JOHNSON, C., 65 Chapel Street, Dukinfield, Cheshire. *l, c.*
- 1957 JOHNSON, Major F. L., M.B.E., T.D., F.R.E.S., 25, Fermoy Road, Thorpe Bay, Essex. *rh.*
- 1945 JOHNSON, Major-General Sir GEORGE F., K.C.V.O., C.B., C.B.E., D.S.O., Castlesteads, Brampton, Cumberland. *l, orn.*

ELECTION.

- 1956 KEITH-JOHNSTON, COLIN, 350, Finchley Road, London, N.W.3. *l.*
- 1946 KEMP, J. K. C., 57 Court House Road, Maidenhead, Berks. *l.*
- 1956 KENNARD, H. A., Torns, Ashburton, Devon. *l, ml.*
- 1943 KERSHAW, Col. S. H., D.S.O., Alderman's Place, Aspley Heath, Bletchley, Bucks. *l.*
- 1928 KETTLEWELL, H. B. D., M.A., M.B., B.CHIR., M.R.C.S., L.R.C.P., F.R.E.S., Dept. of Zoology, University Museum, Oxford. *g, l.*
- 1960 KINGSBURY, G. M. Farnboro' House, Kirkdale, Sydenham, S.E.26. *l.*
- 1958 KINSELLA, Mrs. Y. P., Chy-an-Gwel, Crippas Hill, St. Just, nr. Penzance, Cornwall. *l, c.*
- 1947 KLIMESCH, J., Donatusgasse 4, Linz-a-Donau, Austria. *ml.*
- 1944 KLOET, G. S., F.Z.S., F.R.E.S., 4, Devonshire Park Road, Davenport, Stockport, Cheshire. *ent.*
- 1955 KLOTS, Prof. ALEXANDER B., B.S., M.S., PH.D., 215, Young Avenue, Pelham, New York, U.S.A. *l, systematics, ecology.*
- 1959 KNIGHT, J. E., F.R.E.S., Doughton Cottage, Ross-on-Wye, Herefs. *l, nat. phot.*
- 1958 KNILL-JONES, R. P., Brooklands, Freshwater, Isle of Wight. *l.*
- 1961 KYLE, Dr. D., M.A., M.B., B.CH., Glasfryn, Brecon, S. Wales. *od.*
- 1959 LANE, C. F., 55, Garlichill Road, Epsom Downs, Surrey. *l.*
- 1951 LANGMAID, J. R., B.A., M.B., B.CHIR., 9, Craneswater Park, Southsea, Portsmouth, Hants. *l.*
- 1956 LANGTON, P. H., B.A., F.R.E.S., c/o The Grammar School, March, Cambs. *c, l.*
- 1941 LAST, H. R., F.R.E.S., 12, Winkworth Road, Banstead, Surrey. *c, l.*
- 1946 LATHAM, F. H., F.R.E.S., "The Elms", Mapplesborough Green, Redditch, Worcs. *l.*
- 1927 LAWSON, H. B., "Churchmead," Pirbright, Surrey. *l.*
- 1957 LAWSON, P. H., B.A., "The Mount", Chobham, nr. Woking, Surrey. *l.*
- 1952 LEECH, M. J., "The Spinney," Freshfield Road, Formby, Nr. Liverpool. *l, c.*
- 1952 LEES, F. H., F.R.E.S., "The Gables," Maidencombe, Torquay. *l.*
- 1948 LESTON, D., F.Z.S., F.R.E.S., 44, Abbey Road, London, N.W.8. *hem. (Life Member.)*
- 1947 LEWIS, E., F.R.E.S., 8, Parry Road, South Norwood, London, S.E.25. *c.*
- 1961 LEWIS, Brigadier H. L., Wyck, Rissington, Gloucestershire. *rh.*
- 1951 LING, R. B., The Severells, Rectory Lane, Sidcup, Kent. *l.*
- 1933 LIPSCOMB, Maj.-Gen. C. G., H.Q., J.S.L.O., Bonn, Germany. *l.*
- 1937 LISNEY, A. A., M.A., M.B., F.R.E.S., "Dune Gate," Clarence Road, Dorchester, Dorset. *l.*
- 1948 LLEWELYN, Mrs. J. R., B.SC. (HORT.), F.R.E.S., 38, Fernleigh Rise, Ditton, Maidstone, Kent. *ent.*

ELECTION.

- 1960 LLOYD, D. M., 134, Elgar Avenue, Tolworth, Surbiton, Surrey.
l. c.
- 1948 LOCKINGTON, N. A., M.A., A.R.I.C., 19, Spring Grove, Loughton,
Essex. *ent.*
- 1961 LONG, R., 107 Bath Street, St. Helier, Jersey, Channel Isles. *ent.*
ml.
- 1960 LORIMER, J. A., B.A., M.B., B.CHIR., Roycroft, 23, King's Avenue,
Buckhurst Hill, Essex. *l.*
- 1948 LORIMER, R. I., 8, Southway, Totteridge, N.20. *l.*
- 1950 LOVELL, R., 27, Athenaeum Road, Whetstone, London, N.20. *l.*
- 1959 LUFF, M. L., Flat 3, 8, The Downs, Wimbledon, London, S.W.20.
c.
- 1957 LYDGATE-BELL, H. G., 74, Belgrave Avenue, Watford, Herts.
l, orn.
- 1954 LYON, F. H., M.B.E., F.R.E.S., Green Headland, Sampford Peve-
rell, Tiverton, Devon. *l.*
- 1958 McCLEERY, Dr. C. H., M.B., B.S., c/o Director of Medical Services,
Dar-Es-Salaam, Tanganyika. *ent.*
- 1953 McCURE, A. M., Bowyers Court, Wisborough Green, Sussex. *l.*
- 1961 McCORMICK, R. F., 11 Lilian Road, Streatham Vale, S.W.16.
l, c, hym.
- 1952 McCRAE, A. W. R., P.O. Box 41, Kampala, Uganda. *l.*
- 1950 McDERMOTT, Miss C. A., "The Dene," Borough Green, Kent. *rh.*
- 1952 MACKWORTH-PRAED, C. W., F.R.E.S., Castletop, Burley, Hants. *ent.*
- 1960 MACKWORTH-PRAED, H. W., Tunbarr, Headley, Epsom, Surrey. *l.*
- 1949 MACNICOL, D. A. B., M.B., CH.B., 52, St Albans Road, Edinburgh
9. *l. ml.*
- 1931 MACNULTY, B. J., PH.D., B.SC., F.R.I.C., F.R.E.S., *Hon. Secretary*,
74, High Bridge Street, Waltham Abbey, Essex. *l, c.*
- 1956 MAITLAND-SMITH, Capt. GERALD, 2/10 P.M.O., Gurkha Rifles,
Falais, Claremont Road, Claygate, Surrey. *l.*
- 1961 MAJOR, R. F., 48 Brodercroft Road, Orpington, Kent. *l.*
- 1949 MANLEY, G. E. L., 151, Ebury Street, London, S.W.1. *l.*
- 1945 MANLEY, Lt.-Col. W. B. L., F.R.E.S., Greenways, Shoreham Rd.,
Otford, Kent. *ent.*
- 1960 MANSELL, C. G., 28, Dorset Road, Merton Park, London, S.W.19.
l.
- 1956 MANSELL, G. H., L.R.I.B.A., *Council*, 28 Dorset Road, Merton Park,
London, S.W.19.
- 1960 MANSELL, Mrs. G. H., 28, Dorset Road, Merton Park, London,
S.W.19. *l.*
- 1932 MARCON, Rev. J. N., Loxwood Vicarage, Billingshurst, Sussex. *l.*
- 1930 MARSH, Capt. DUDLEY G., "White Gates", Wingham Rd., Little-
bourne, Nr. Canterbury, Kent. *l.*
- 1956 MARSH, Capt. J. C. S., c/o Lloyds Bank Ltd., Cox's & King's
Branch, 6, Pall Mall, S.W.1. *l.*

ELECTION.

- 1950 MARTIN, E. L., 35, Goddington Road, Bourne End, Bucks. *l, t.*
- 1922 MASSEE, A. M., O.B.E., D.SC., F.R.E.S., *President*, East Malling Research Station, Kent. *hem, c, acarina.*
- 1960 MASURIER, P. LE, Alt na Craig, Aviemore, Inverness-shire. *l, ent.*
- 1959 MATHESON, I. C. C., 109, Alleyn Park, West Dulwich, S.E.21. *l.*
- 1955 MATTHEWS, D. P. L., T.D., *Council*, Flat 5, 51, Cadogan Place, London, S.W.1. *l.*
- 1947 MAXWELL, Sir REGINALD M., M.A., G.C.I.E., K.C.S.I., Barford House, St Mary Bourne, Andover, Hants. *ent.*
- 1951 MAY, J. T., Homeland, Beech, Alton, Hants. *l.*
- 1946 MELLOWS, CHARLES, Alliot House, The College, Bishop's Stortford, Herts. *l, hym.*
- 1952 MENZIES, I. S., "Eden Roc", Florida Road, Ferring-by-Sea, Sussex. *c, l, orth.*
- 1946 MERE, R. M., F.R.E.S., *Trustee, Vice-President*, Mill House, Chiddingfold, Surrey. *l.*
- 1951 MESSENGER, J. L., B.A., Stonehaven, Wormley Hill, Witley, Surrey. *l.*
- 1951 MICHAELIS, H. N., 10, Didsbury Park, Didsbury, Manchester, 20. *l.*
- 1945 MICHAUD, J., PH.D., 22, Routh Road, London, S.W.18. *ent.*
- 1938 MINNION, W. E., 40, Cannonbury Avenue, Pinner, Middlesex. *l.*
- 1960 MITCHELL, G. A., 5, Longhill Road, Catford, London, S.E.6. *l.*
- 1952 MONTGOMERY, Major J. R. P., M.C., 17 Parachute Bn. (9 D.L.I.), T.A., Burt Terrace Drill Hall, Gateshead, Co. Durham. *l.*
- 1957 MOON, H. N., 319, Coniscliffe Road, Darlington, Co. Durham. *rh.*
- 1946 MOORE, B. P., B.SC., PH.D., F.R.E.S., C.S.I.R.O. Divn. of Entomology, P.O. Box 109, City, Canberra, A.C.T., Australia. *od, c.*
- 1947 MOORE, D. R., Manor Cottage, Blackthorne, nr. Bicester, Oxon. *l. (Life Member.)*
- 1947 MOPPETT, A. A., B.A., 39, Fairdale Gardens, Hayes, Middlesex. *ent.*
- 1951 MORE, D., The Little House, Hockley Road, Rayleigh, Essex. *ent.*
- 1949 MORGAN, H. D., F.R.E.S., 110 Victoria Avenue, Porthcawl, Glam. *ent.*
- 1920 MORISON, G. D., B.SC., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen, Scotland. *ec. ent.*
- 1930 MORLEY, A. M., O.B.E., M.A., F.R.E.S., 9, Radnor Park West, Folkestone, Kent. *l.*
- 1953 MORRIS, M. G., F.R.E.S., *Hon. Curator*, Dungallain Cottage, Oakwood Road, Maidstone, Kent. *l.*
- 1961 MORRIS, W. H. H., M.P.S., 66, Wells Road, Penn, Wolverhampton.
- 1945 MURRAY, Rev. D. P., F.R.E.S., The Lodge, Stoke Golding, Nr. Nuneaton, Leics. *l.*
- 1957 MURRAY, E. G., 22 Evelyn St., Deptford, London, S.E.8. *l.*

- 1960 MYERS, A. A., 34, Crundale Avenue, Kingsbury, London, N.W.9.
l, ec, b.
- 1949 NEWMAN, D. E., Sunnymede, The Croft, Brightwell-cum-Sotwell,
Wallingford, Berks. *l.*
- 1926 NEWMAN, L. HUGH, F.R.E.S., Betsoms, Westerham, Kent. *l.*
- 1950 NEWTON, J., B.SC., 11, Oxlease Close, Tetbury, Glos. *l.*
- 1945 NEWTON, J. L., M.R.C.S., L.R.C.P., F.R.E.S., 8, Stainburn Crescent,
Leeds 17. *l, b.*
- 1930 NIBLETT, M., F.R.E.S., 10, Greenway, Wallington, Surrey. *galls*
- 1953 NISSEN, C. L., F.R.E.S., Flat 10, 250, South Norwood Hill, Lon-
don, S.E.25. *l.*
- 1961 NIXON, G. E. J., B.A., 8 Upper Edgeborough Road, Guildford,
Surrey. *hym.*
- 1955 NOBLE, F. A., 2, Newton Road, Sparkhill, Birmingham, 11. *l.*
- 1958 NOLDE, W. F., 83, Hazelbank Road, Catford, London, S.E.6. *c.*
- 1938 ODD, D. A., F.Z.S., F.R.E.S., "Herons Ghyll", Stall House Lane,
North Heath, Pulborough, Sussex. *l.*
- 1932 O'FARRELL, A. F., B.SC., A.R.C.S., F.R.E.S., New England Univer-
sity, Armidale, N.S.W., Australia. *od, cr, ent.*
- 1934 OLIVER, G. B., "Corydon", Amersham Road, Hazlemere, High
Wycombe, Bucks. *l.*
- 1943 OLIVER, G. H. B., "Corydon", Amersham Road, Hazlemere,
High Wycombe, Bucks. *l.*
- 1952 OLSEN, E. T., Hersegade 5, Roskilde, Denmark. *ml.*
- 1945 OWEN, GODFREY V., Orford, 63, Manor Park Road, West Wick-
ham, Kent. *l.*
- 1961 OWSTON, A. J. W. 173, Riversmead Court, Hurlingham, London,
S.W.6. *rh.*
- 1942 PARFITT, R. W., "Penpethy", Manor Rd., Farnborough, Hants. *l.*
- 1946 PARMENTER, L., F.R.E.S., 94, Fairlands Avenue, Thornton Heath,
Surrey. *d. (Life Member.)*
- 1949 PARSONS, R. E. R., F.R.E.S., I.P., Woodlands Lodge, Woodlands
Close, Ottershaw, Surrey. *l.*
- 1950 PAYNE, J. H., 10, Ranelagh Road, Wellingborough, Northants.
rh, breeding.
- 1940 PAYNE, R. M., 8, Hill Top, Loughton, Essex. *c, od, orth, b.*
(Life Member.)
- 1957 PEARCE, C. J., 2, Head Street, Rowhedge, Colchester, Essex.
ent.
- 1955 PEARSON, A. J. R., Dower Cottage, Feering, Colchester, Essex.
rh.
- 1959 PEET, T. N. D., Beaconswood, Rednal, nr. Birmingham. *l.*
- 1940 PELHAM-CLINTON, EDWARD C., F.R.E.S., 34, Craigmillar Park,
Edinburgh, 9. *l.*
- 1959 PENGILLY, Miss K. M. I., 5 Grosvenor Road, Weymouth, Dorset. *l.*
- 1958 PENROSE, R. J., 86, Mildred Avenue, Watford, Herts. *ent.*

- 1928 PERKINS, J. F., B.Sc., F.R.E.S., 95, Hare Lane, Claygate, Surrey. *hym.*
- 1944 PERRY, K. M. P., 15, Roundwood Way, Banstead, Surrey. *c.*
- 1958 PHILLIPS, Miss A., 56, Park Avenue, Maidstone, Kent. *c.*
- 1960 PHILLIPS, A. F., 117, Engadine Street, Southfields, London, S.W.18. *l.*
- 1958 PHILLIPS, J. H. C., M.A., F.R.C.S., 29, Headlands, Kettering, Northants. *l.*
- 1945 PHILPOTT, V. W., F.R.E.S., 'Elmendene', 114A, Wyke Road, Weymouth, Dorset. *l.*
- 1933 PINNIGER, E. B., F.R.E.S., "Littlecote", 19, Endlebury Road, Chingford, London, E.4. *od, n, l.*
- 1960 PLANTROU, J. E., 57, Boulevard Murat, Paris 16. *l, rh.*
- 1949 PLATTS, J. H., Green Shutters, Manthorpe Road, Grantham, Lincs. *l.*
- 1947 POLACEK, V. B., Brandys-nad-Labem, c.p. 601, 1 patro, Komen-skeho-ulice, Czechoslovakia. *b, ent, orn.*
- 1958 POLLAK, P. M., 5, Matlock Court, Kensington Park Road, London, W.11. *c, arachnology.*
- 1933 POOLLES, S. W. P., 154, Thorpe Road, Peterborough, Northants. *l.*
- 1949 POPHAM, W. J., 89, Frederick Place, Plumstead, London, S.E.18. *l.*
- 1955 POTTER, N. B., The Mill House, North Warnborough, Hants. *l.*
- 1961 PRICE, A., 6, Mansfield Road, Reading, Berks. *c. (hydradephaga).*
- 1950 PRICE, G. C., "Alpha," 67, Cornyx Lane, Solihull, Warwick-shire. *l.*
- 1948 PRIDEAUX, A. G., B.A., Union Club, St. James' Street, London, S.W.1. *ent (rh), orn.*
- 1957 PRING, M., 3, Park Homer Road, Colehill, Wimborne, Dorset. *l.*
- 1945 PUREFOY, J. BAGWELL, c/o Upper Tilt Works, Cobham, Surrey. *l.*
- 1961 QUINLAN, J., 25, Ronaldstone Road, Sidecup, Kent. *hym.*
- 1946 RANSOME, Major-General A. L., C.B., D.S.O., M.C., The Close, Braishfield, Romsey, Hants. *rh.*
- 1955 RAVEN, Rev. Canon C. E., D.D., D.S.C., F.B.A., F.L.S., 10, Mad-ingley Road, Cambridge. *l.*
- 1953 RAWLINGS, C. J., 5, Berther Road, Emerson Park, Hornchurch, Essex. *l.*
- 1946 RAY, H., Mill House Cottage, Bishopstoke, Hants. *rh.*
- 1960 READ, D. K., 76b High Street, Bushey, Herts. *l.*
- 1955 REDGRAVE, A. C. R., *Council*, 2, Connaught Way, Tonbridge Wells, Kent. *l.*
- 1952 REID, J. F., 19, High Street, Leighton Buzzard, Beds. *l.*
- 1950 REID, W., A.M.I.C.E., 6, Whirlow Park Road, Sheffield 11, Yorks. *ent.*
- 1945 RICHARDS, Prof. O. W., M.A., D.S.C., F.R.S., F.R.E.S., Department of Zoology, Imperial College of Science and Technology, South Kensington, London, S.W.7. *ent.*

ELECTION.

- 1957 RICHARDS, R. F., 25, Bishops Road, Fulham, S.W.6. *l*.
- 1948 RICHARDSON, A. E., 391, Malden Road, Worcester Park, Surrey. *l*.
- 1942 RICHARDSON, AUSTIN, M.A., F.R.E.S., Beaudesert Park, Minchinhampton, Glos. *l*.
- 1936 RICHARDSON, N. A., 11, Windsor Street, Bletchley, Bucks. *l*.
- 1953 RIORDAN, B. D., 75, Blenheim Road, North Harrow, Middlesex. *c*.
- 1953 RIVERS, C. F., F.R.E.S., 98, Windsor Road, Cambridge. *l* (*virus diseases of insects*).
- 1949 ROBINSON, H. S., F.R.E.S., c/o Employees' Provident Fund, Brickfields Road, Kuala Lumpur, Malaya. *l*.
- 1954 ROBINSON, P. J. M., B.Sc., A.M.I.C.E., c/o John Mowlem & Co., P.O. Box 1578, Teheran, Iran. *l*.
- 1953 ROCHE, C. G., A.C.A., 6 Aberdeen Court, Aberdeen Park, London, N.5. *hym*.
- 1942 ROCHE, P. J. L., M.R.C.S., L.R.C.P., F.R.E.S., Medical Officer, H.M. Prison, Pentonville, London, N.7. *c, hem, e.l*.
- 1953 ROSE, IAN C., "White Lodge", Mistley, Essex. *ent*.
- 1960 ROWBERRY, D., Loxley House, Maybury Hill, Woking, Surrey. *ent*.
- 1932 RUDLAND, W. LEWIS, F.R.E.S., 452, Hythe Road, Ashford, Kent. *l*.
- 1960 RUSSELL, Major A. BEDFORD, R.H.Q., Coldstream Guards, Birdcage Walk, London, S.W.3.
- 1952 RUSSWURM, A. D. A., F.R.E.S., Coridon, Ober Road, Brockenhurst, Hants. *l*.
- 1961 SADLER, E. A., No. 1, New Farm Cattages, Knowle Lane, Cranleigh, Surrey. *l*.
- 1946 SAUNDBY, Air-Marshal Sir ROBERT H. M. S., K.C.B., K.B.E., M.C., D.F.C., A.F.C., F.R.E.S., Oxleas, Burghclere, near Newbury, Berks. *l*.
- 1947 SAUNDERS, J. M. K., 22, Francis Road, Pinner, Middlesex. *l* (*especially rh*).
- 1958 SAVAGE, L. E., 65, Cranmer Avenue, Hove, 4, Sussex. *l*.
- 1956 SCHOFIELD, Wing Comdr. C. H., Grey Barn, Worth Matravers, Swanage, Dorset. *l, b*.
- 1927 SCOTT, Col. E., D.S.O., M.D., S.B.ST.J., "Suomi," Westwell, Ashford, Kent. *l*.
- 1960 SEACOME, R. J., M.A., 59 East Street, Helens, Abingdon, Berks. *l*.
- 1946 SELF, K. W., 53b, Earls Avenue, Folkestone, Kent. *ent*.
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Reynolds & Co., P/O Box 5026, Mombasa, Kenya. *l*. (*Life Member*).
- 1961 SHAFFER, M., 28, West Bank, Amhurst Park, London, N.16. *l*.
- 1958 SHARMAN, A. J., Pallavaram P.O., South India. *rh*.
- 1951 SHAW, R. G., 5, Barnham Road, Chingford, London, E.4. *l, hem*.
- 1947 SHORT, H. G., M.Sc., "Leaholme", 8, Milbourne Lane, Esher, Surrey. *l*.

ELECTION.

- 1954 SNOWLER, A. J., M.Sc., 19, Harvel Crescent, Abbey Wood, London, S.E.2. *l*.
- 1960 SIDE, K. C., 107, London Road, Stone, Dartford, Kent. *c*.
- 1948 SIGGS, L. W., Sungate, Football Green, Minstead, nr. Lyndhurst, Hants. *l*.
- 1957 SKINNER, B. F., *Council*, 85, Elder Road, W. Norwood, S.E.27. *l*.
- 1960 SMITH, A., A.R.C.A., 255, Kent House Road, Beckenham, Kent. *ent*.
- 1956 SMITH, F. G., Shenstone Lodge, Cokes Lane, Chalfont St. Giles, Bucks. *l*.
- 1941 SMITH, Lieut. FDK. WM., R.N.V.R., South Fawley Cottage, Wantage, Berks. *l*, *hym*. (*Life Member*).
- 1946 SOUTHWOOD, T. R. E., B.Sc., PH.D., A.R.C.S., M.I.BIOL., F.R.E.S., Imperial College Field Station, Silwood Park, Sunninghill, Nr. Ascot, Berks. *ent*, *hem*, *c*, *ecology*.
- 1961 SPEIGHT, M. C. D., 28, Richmond Wood Road, Queen's Park, Bournemouth, Hants. *Syrphidae*, *ent*.
- 1949 SPENCER, K. A., B.A., F.R.E.S., 19, Redington Road, London, N.W.3. *l*, *d*.
- 1947 SPERRING, A. H., Slindon, Fifth Avenue, Warblington, Hants. *l*.
- 1956 SPOCZYNSKA, Mrs. J. O. I., "Jasmineholm", 100, Kupley Park Terrace, Northampton. *l*.
- 1943 SPREADBURY, W. H., 3 Sherwood Road, Seaford, Sussex. *nat. hist*.
- 1953 STALLWOOD, B. R., 17 Claremont Avenue, Sunbury-on-Thames, Middlesex. *l*.
- 1949 STANLEY, F. C., F.R.E.S., "Swanmore", Bowes Hill, Rowlands Castle, Hants. *l*, *c*.
- 1927 STANLEY-SMITH, F., "Hatch House", Pilgrims Hatch, Brentwood, Essex. *l*.
- 1958 STEWART, R. H. A., B.A., Downs House Flat, Highfield, Lymington, Hants. *l*.
- 1942 STIDSTON, Eng. Capt. S. T., R.N., F.R.E.S., "Ashe", Ashburton, Devon. *l*.
- 1955 STOCKLEY, R. E., 18 Leighton Gardens, Sanderstead, Surrey. *l*.
- 1952 STORACE, LUCIANO, Museo Storia Naturale, Via Brigata Liguria, 9, Genoa, Italy. *l*.
- 1924 STOREY, W. H., Fairstead, Long Road, Cambridge. *ent*.
- 1945 STOUGHTON-HARRIS, G., M.A., F.C.A., F.R.E.S., "Rosegarth", Waldens Road, Horsell, Woking, Surrey. *l*.
- 1948 STRUTHERS, F. M., 143a, Gander Green Lane, Cheam, Surrey. *l*.
- 1929 STUBBS, G. C., Egremont House, Ely, Cambs., and Survey Office, Kuala Lumpur, Malaya.
- 1934 SUTTON, GRESHAM R., 6, Kenilworth Gardens, Loughton, Essex. *l*, *c*.
- 1960 SWAN, B. M., PH.C., M.P.S., F.R.E.S., 2, Rosemary Road, Bearstead, Maidstone, Kent. *l*.

- 1950 SYMES, H., M.A. (OXON), 52, Lowther Road, Bournemouth, Hants. *l*.
- 1942 TALBOT DE MALAHIDE, THE LORD, C.M.G., Malahide Castle, Dublin, Ireland. *l*.
- 1922 TAMS, W. H. T., F.R.E.S., 20, Ranelagh Avenue, Fulham, London, S.W.6. *ent*.
- 1960 TATUM, J. B., B.S.C., F.R.A.S., 34, Brangwyn Avenue, Brighton, 6, Sussex. *orn. ent*.
- 1950 TAYLOR, A. S., 364, Burley Road, Leeds 4. *l*.
- 1958 TAYLOR, R. C., Vinnicks Cottage, Highclere, nr. Newbury, Berks. *l*.
- 1949 TEMPLE, Miss VERE, F.R.E.S., King's Chase, Tollard Royal, Salisbury, Wilts. *l, hym, orth, od*.
- 1961 THIMANN, R. G., 53, Burlington Road, Sherwood, Nottingham. *c*.
- 1952 THORN, Miss B. A., "Paviott", 16, Springfields, Broxbourne, Herts. *l*.
- 1952 THORNTON, J., 43, Barnes Street, Clayton-le-Moors, Accrington, Lancs. *l*.
- 1950 THORPE-YOUNG, D. W., A.I.A.C., F.Z.S., 11, Waverley Way, Carshalton Beeches, Surrey. *ent*.
- 1956 TIDMARSH, A. C. B., Furze field, West End Lane, Nr. Haslemere, Surrey. *l*.
- 1956 TIDMARSH, J. S. C., Furze field, West End Lane, Nr. Haslemere, Surrey. *l*.
- 1945 TIMMS, C., F.R.E.S., 524a, Moseley Road, Birmingham, 12. *d*.
- 1953 TORLESSE, Rear Admiral A. D., C.B., D.S.O., Trentham, Burton Joyce, Notts. *l*.
- 1948 TORSTENIUS, STIG, Foreningsvägen 10, Stocksand, Sweden. *l*.
- 1960 TREMEWAN, W. G., 56, Hart Road, Byfleet, Surrey. *Zygaenidae*.
- 1950 TROUGHT, TREVOR, M.A., F.R.E.S., Brookland, Tysoe, Warwickshire. *l*.
- 1948 TRUNDELL, E. E. J., "Camilla", Bowesden Lane, Shorne Ridgeway, Gravesend, Kent. *ent, l*.
- 1948 TUBBS, Mrs M., 9, Lingfield Road, Wimbledon Common, S.W.19. *rh*.
- 1947 TUBBS, R. S., O.B.E., F.R.I.B.A., 9, Lingfield Road, Wimbledon Common, S.W.19. *rh*.
- 1934 TUNSTALL, H. G., 11 St. James Avenue, Ewell, Surrey. *l*.
- 1940 TURNER, A. D., 19, Manor Close, Kingsbury, London, N.W.9. *ent*.
- 1948 TURNER, A. H., F.Z.S., F.R.E.S., F.R.MET.S., Mariarti, Star Lane, North Curry, Taunton, Somerset. *ent, insect migration, conchology. (Life Member.)*
- 1944 TURNER, H. J., 4, Browning Avenue, Boscombe, Nr. Bournemouth, Hants. *l*.
- 1953 TWEDIE, M. W. F., M.A., F.Z.S., Barn House, Houghton Green, Rye, Sussex. *l*.

- 1952 UFFEN, R. W. J., F.R.E.S., 4, Vaughan Avenue, Stamford Brook, W.6. *l, hym, d.*
- 1945 VALENTINE, ARTHUR, Ivey House, West Shepton, Shepton Mallet, Somerset. *ent.*
- 1922 VALLINS, F. T., A.C.I.L., F.R.E.S., *Council*, 4, Tattenham Grove, Tattenham Corner, Epsom, Surrey. *Lycaenidae. (Life Member.)*
- 1951 VARLEY, Prof. G. C., M.A., PH.D., F.R.E.S., F.Z.S., Hope Dept. of Entomology, University Museum, Oxford. *hym, d.*
- 1951 VIETTE, P. E. L., Paris Museum (Entomology), 45 bis, Rue de Buffon, Paris 5, France. *l.*
- 1960 WACHER, P. B., Petham House, Petham, nr. Canterbury, Kent. *l.*
- 1949 WADE, D., 17, Waldegrave Avenue, Holderness Road, Hull, Yorks. *l, orn.*
- 1929 WAINWRIGHT, CHARLES, B.SC., F.R.I.C., 42, St. Bernards Road, Olton, Warwickshire. *l.*
- 1947 WAKELY, L. J. D., O.B.E., M.A., Long Meadow, Forest Row, East Horsley, Surrey. *l.*
- 1930 WAKELY, S., 26, Finsen Road, Ruskin Park, London, S.E.5. *l.*
- 1951 WALKER, D. H., B.SC. (ENG.), A.M.I.C.E., "Bellargus", Elmfield Way, Sanderstead, Surrey. *l.*
- 1953 WALLIS, J. L. P., A.R.I.C.S., C.E. in C. Dept., Admiralty, Chamberlain Way, Pinner, Middx. *ent, l*
- 1959 WALLIS, R. B., 156, Great Tattenhams, Epsom Downs, Surrey. *l.*
- 1956 WARD, W. J. V., B.A., A.R.C.S.C., "Haslemere", 23, Darlington Road, Stockton-on-Tees, Durham. *l.*
- 1939 WATKINS, N. A., M.A., F.R.E.S., Soldon, Druid Road, Stoke Bishop, Bristol, 9, Glos. *l.*
- 1945 WATKINS, O. G., F.R.E.S., 20, Torr View Avenue, Peverell, Plymouth, Devon. *l, od.*
- 1945 WATSON, R. W., F.P.C.A., F.A., F.C.C.S., F.COMM.A., F.R.E.S., "Porcorum", Sandydown, Boldre, nr. Lymington, Hants. *l.*
- 1926 WATTS, W. J., 6, Capel Terrace, Southend-on-Sea, Essex. *c.*
- 1947 WEAL, R. D., 124, Marmion Avenue, South Chingford, London, E.4. *c.*
- 1945 WEBB, HARRY E., F.R.E.S., 20, Audley Road, Hendon, London, N.W.4. *l.*
- 1957 WEBB, N. G. G., Fernshaw, Rockfield Road, Oxted, Surrey. *l.*
- 1945 WEDDELL, B. W., 13, The Halve, Trowbridge, Wilts. *ent.*
- 1953 WEST, B. B., A.R.I.B.A., 37, Cardington Road, Bedford. *l, od.*
- 1947 WEST, B. K., 193, Shepherds Lane, Dartford, Kent.
- 1945 WHEELER, A. S., 26, Ashurst Road, Tadworth, Surrey. *l.*
- 1948 WHICHER, L. S., F.R.E.S., A.I.A.E.E., 6, Chisholm Road, Richmond. Surrey. *c.*

ELECTION.

- 1958 WHITE, G. B., 65, Virginia Road, Thornton Heath, Surrey.
ent, orn.
- 1954 WHITEHEAD, J., 16, Westbourne Arcade, Bournemouth, Hants. *l.*
- 1946 WHITEHORN, K. P., F.R.E.S., "Spindles", Windsor Road, Graves-
end, Kent. *l.*
- 1920 WIGHTMAN, A. J., F.R.E.S., 67, The Spinney, Pulborough,
Sussex. *l. (Noctuidae)*
- 1958 WILDING, N., 66, Brabourne Rise, Beckenham, Kent. *l.*
- 1946 WILDRIDGE, W., "Flavion", Penn Road, Park Street, Nr. St.
Albans, Herts. *ent.*
- 1960 WILKINSON, A. D., M.B.O.U., Tynedale, Enton, Godalming, Surrey.
local records; migration.
- 1960 WILLCOX, H. N. A., 19, York Road, Windsor, Berks. *l.*
- 1945 WILLIAMS, E. F., F.R.E.S., The Cottage, Navestockside, Brent-
wood, Essex. *l.*
- 1957 WILLIAMS, E. O., M.A., F.R.C.S., M.R.C.O.G., "Bonners",
Hambleton, Surrey. *l.*
- 1948 WILLIAMS, L. H., PH.D., B.SC., 31, Armour Road, Tilehurst, Read-
ing, Berks. *ent.*
- 1932 WILLIAMS, S. W. C., Lyndore, 27, Colmere Gdns., Hinton Wood
Avenue, Highcliffe, Christchurch, Hants. *l.*
- 1960 WILLS, D. A., 41, Fore Street, St. Just, Penzance, Cornwall. *l.*
- 1956 WOODWARD, R. J., B.PHARM., 65, Valleyfield Road, Streatham,
S.W.16. *rh.*
- 1927 WORMS, C. G. M. DE, M.A., PH.D., F.R.I.C., F.R.E.S., M.B.O.U.,
Council, "Three Oaks", Shore's Road, Horsell, Woking,
Surrey. *l. orn.*
- 1960 WRAIGHT, C. A., 10 Windermere, Lytton Grove, Putney, London,
S.W.15. *l, ent.*
- 1957 WRIGHT, A. E., 9, Albert Court Mansions, Kensington, London,
S.W.7. *rh. esp. Satyridae.*
- 1955 WRIGHT, DAVID, Whitehill House, Whitehill, Bordon, Hants. *l.*
- 1949 WRIGHTSON, A. L., 93, Morse Street, Lower Brunshaw, Burnley,
Lancs. *l.*
- 1957 YANO, J., c/o Iwai & Co., Capel House, 54, New Broad Street,
London, E.C.2. *rh.*
- 1960 YARDLEY, Miss C. C., 68 Selworthy Road, Catford, London, S.E.6.
l.
- 1945 YODEN, GEORGE H., F.R.E.S., 18, Castle Avenue, Dover, Kent. *l.*
- 1950 YOUNG, Miss G. M., 30, Cranley Gardens, Palmers Green, London,
N.13. *l.*
- 1952 YOUNG, L. D., 72 West Farm Close, Ashted, Surrey. *ent.*

Members will greatly oblige by informing the Hon. Secretary of any errors in, additions to, or alterations required in the above addresses and descriptions.

COUNCIL'S REPORT, 1960

This has been a vintage year in the history of the Society. At the end of 1960, the membership stood at the record total of 518, which represents a net increase of 29. The total is still far short of the ambitious target set by your President in his letter, but it is hoped that the trend will be continued in the coming year by the recruitment to our ranks of many of the keen entomologists not yet enrolled. The present membership is made up of 4 Honorary, 4 Special Life, 13 Life, 239 Ordinary, and 258 Country Members. Six members died during the year, and will be greatly missed. They were Major B. C. Barton, Dr. G. S. Robertson and Messrs. A. H. Lanfear, C. C. Phelps, F. Rumsey and S. G. Wallis-Norton. In addition, notification was received of the death in August 1959 of Mr. D. J. Gordon. Forty-seven new members joined the Society in 1960, 5 resigned, and 7 were struck off.

On 28th January, Messrs. F. J. Coulson and E. E. Syms were made Honorary Members in recognition of their many years of service to the Society.

One of the most important decisions made by your Council during the year was that which resulted in the opening of a Housing Fund. The Society has always benefited from the good will of other bodies for the provision of Rooms in which to hold our indoor meetings and to house our libraries and collections. Your Council is of the opinion that a logical next step would be the purchase of our own Rooms in London, though almost certainly this will not take place for some years. Meanwhile, the Housing Fund has been opened to enable benefactors to give or bequeath money for the specific purpose of contributing to a permanent home for the Society. Over £240 has already been subscribed, mostly anonymously.

It is appropriate, while referring to premises, to record again the best thanks of the Society to the staff of the Junior Institution of Engineers for their help and co-operation during the past year.

Another important step has been made in connection with the Society's Collections. At present they are housed in a variety of cabinets, some good, some bad. Most of them are crowded, and expansion and rearrangement are extremely difficult. Thus it has been decided, again as a long term policy, to change gradually to Hill's units, which are more compact, easier to handle and more adaptable. This matter will be referred to again shortly.

The Proceedings and Transactions for 1959 were published in November. They contained xlvii + 239 pages, 10 plates (2 coloured) and 4 text figures. The coloured plates illustrate Part IV of Mr. G. Haggett's *Larvae of the British Lepidoptera not figured by Buckler*. A catalogue of the books in the Society's Library occupies 73 pages, and is obtainable as a separate. Our thanks are due to Mr. K. A. Spencer who gave the two blocks of the field meeting groups.

Your Council gratefully acknowledges the receipt, through the Royal Society, of a Parliamentary grant-in-aid of £100 towards the cost of production.

The Annual Dinner was a great success, and 72 members and their guests attended. The event took place at the Grosvenor Hotel on Friday, 28th October.

The Annual Exhibition at Burlington House was held on the following day, and though there were fewer exhibits than usual, the standard was good. The subject for special attention was Aquatic Insects. Once again the outstanding exhibits were selected and photographed by Messrs. T. G. Howarth and W. H. T. Tams, to whom our hearty thanks are due. Similarly, our thanks are extended to Mr. D. W. Thorpe-Young, who for many years has attended to the receipt and recording of the exhibits as they come in. This task entails spending the whole day at the desk, with little chance to meet friends or study the exhibits. The Attendance Book was signed by 272 members and visitors.

Twenty-one Ordinary Meetings were held during the year in the rooms of the Junior Institution of Engineers, Mr. Howarth again arranging the programme. He is thanked particularly for taking advantage of Dr. S. H. Skaife's unexpected visit to this country from South Africa, and persuading him to lecture to us on "Ants as Laboratory Subjects". Some rearrangement of the programme was necessary, and Mr. N. D. Riley is especially thanked for postponing his talk. Fortunately, we were able to hear him in November.

Mr. R. W. J. Uffen was responsible for the arrangement of the programme of Field Meetings. It was decided to send details of these meetings to all members resident in London and the Home Counties, in the hope that more would attend, but the response was small. Mr. and Mrs. Loarridge were again our hosts at Cosford Mill in May, and made the party most welcome, and Mrs. Mere is thanked also for providing tea and hospitality after the meeting at Chiddingfold. Twenty-eight meetings were held, and Mr. Uffen is to be congratulated on making another very interesting programme.

Christmas Cards were produced by the Society again this year, the design once more coming from the pen of Mr. M. W. F. Tweedie. The sales were disappointing, and failed to cover the cost of production.

During the year a start has been made on building up the collection of 2" x 2" colour transparencies. Some 57 have been acquired or presented, and your Council wishes to thank Messrs. S. Beaufoy, J. D. Bradley, R. C. Dyson, R. F. Haynes, E. Lewis, J. Yano and, in particular, J. E. Knight for their kindness and help in this work.

The Hon. Curator reports that Messrs. L. Christie, B. Goater, J. O. T. Howard and H. S. Robinson have given two Hill's units to the Society during the year, in connection with the standardization of the Society's cabinets. The best thanks of the Society are due to these members for their generosity.

During the year your Council has passed a number of resolutions designed to help the Curator in his work, in addition to those concerning the cabinets. One such has been the decision to dispose of all

non-Palaeartic material, comprising 17 drawers. The material, which includes some very fine butterflies, is being offered to members. The F. T. Grant collection of Coleoptera has been received and the best beetles are being added to the Society's representative collection, the remainder being passed to Imperial College Field Station at Silwood Park. The arrangement of the Leston collection of Heteroptera has been postponed pending Council's decision on whether the Wells cabinet, originally earmarked for these bugs, or Hill's units, should be used.

Coleoptera have been presented to the Society in 1960 by Dr. Massee and Mr. Buck, Hymenoptera by Mr. Uffen, and Lepidoptera by Mr. Mere. The Society's thanks are extended to these members for their specimens, all of which are of rare or local species.

The Hon. Librarian reports that the binding of serial publications is up to date, but there is always work to be done as new issues arrive. The Society wishes to thank members for their donations towards the cost of binding.

In our publication for 1959 there will be found "A Catalogue of Books in the Library". This represents a great deal of work by the Librarian and his assistant, and by the editorial staff. It is hoped that more use will be made of the Library, especially by Country Members. Suggestions for, and gifts of, additions will be welcomed. From time to time lists of addenda and corrigenda will be issued.

Again the Society is indebted to the generosity of members: to Dr. A. M. Massee for a copy of the third edition of his book, *The Pests of Fruit and Hops*, to Mr. S. N. A. Jacobs for continental books and journals, to Mr. A. H. Sperring for a complete set of Penguin *New Biology* and to Messrs. Siviter-Smith, E. S. A. Baynes and others for separates.

The Curator of the Horniman Museum has presented a copy of *A Survey of the Animal Kingdom*. In addition to being a guide to the exhibits at the Museum, this is a very readable elementary textbook of zoology.

Part II, Flora of the British Isles, by Sybil J. Roles has been purchased. It contains 460 figures and covers Rosaceae to Polemoniaceae.

Two further parts of the *Handbooks for the Identification of British Insects* have appeared and have been purchased. One is by Walter J. Le Quesne and deals with Hemiptera, Fulgoromorpha; the other is by J. F. Perkins and deals with a further section of the Ichneumoninae. A Polish work by J. Razowski (text in English) has been acquired. It is entitled *European Species of Cnephasiini (Lep. Tortricidae)*.

Exchange arrangements have been entered into with Dr. Remington for the *Journal of the Lepidopterist's Society* (a United States publication) and with the Staatliches Museum für Tierkunde, Dresden for their *Abhandlungen und Berichte*.

We continue to receive the usual journals.

TREASURER'S REPORT FOR 1960

The year has been an expensive one to the Society in more than one direction, as you will presently hear. One item properly belongs to 1959 and others might be carried forward in part to succeeding years; but we finished with a larger bank balance and more investments to augment future income.

HOUSING FUND.

This was opened in March, to commence making provision for the Society's needs at some future date. So far, £241 15s 11d has been subscribed in amounts varying from a few shillings to fifty pounds, with a fine gift of £100 from Mr. Edgar Hare in memory of Edward Step, our late member and Past President. Some deposit interest brings the total of this Fund to £243 19s at 31st December.

CAPITAL ACCOUNT.

There is an increase in the balance here by the addition of £178 17s 6d, the cost of £250 Savings Bonds 1965-75, invested by the Trustees for the Housing Fund.

LIBRARY FUND.

The amount received from members for binding current periodicals was £21 10s. The Fund also takes the entrance fees of forty-nine members, £18 7s 6d. No grant could be made from current income this year, and after paying for books purchased and binding, etc., the closing balance is £53 1s 7d.

PUBLICATION FUND.

The production of our annual volume is always the major expense, and this year it was more costly than usual. The "Proceedings" for 1959, with ten plates and containing some 50 pages more than any previous issue, cost £649. In addition, a supply of copies of 'Bye-laws' was printed, separates of the "Catalogue of Books in the Library", and Christmas cards to a new design by Mr. M. W. F. Tweedie.

The invoice for the 1958 issue of "Proceedings", which had not been rendered at the time of our last Annual Meeting, was finally settled at £30 more than the estimated provision in the Accounts for 1959. In all, £767 is charged to this Fund in 1960.

The very late arrival of "Proceedings, 1959" prevented distribution in time for payment to be received by me for the copies ordered by regular trade customers, and also for the extra separates supplied to authors. Over £21 for these items will come into the next Account. Sales of back numbers of "Proceedings" and of "A Guide to the Smaller British Lepidoptera" were higher than before at £38 10s. The Royal Society once more provided £100 from the Parliamentary Grant-in-Aid of Scientific Publications. £415 from Current Income and £170 from Accumulated Revenue, with the interest on the Misses Chapman's

gift in War Loan and sales of Christmas cards, made up the required amount.

INCOME AND EXPENDITURE ACCOUNT.

Current subscriptions and arrears collected were almost identical with the previous year at £595 16s. Interest from Investments and Deposit, £136, is £17 higher. On the other hand our general expenses increased, mainly owing to more frequent use of the epidiascope and film projectors, and heavier secretarial postages and stationery. The account closes with a surplus of 19s 3d.

BALANCE SHEET.

The increases in Capital Fund and the corresponding Investments I have already explained. No Debtors are shown in the Assets this time. Cash at Bank and in Hand amounting to £631 14s 11d is £56 more than last year, and Accumulated Revenue stands at £332 15s 11d.

Again we have to thank Messrs G. Stoughton-Harris and R. M. Mere for their good offices in acting as honorary auditors.

The Honorary Treasurer, who may perhaps be forgiven for wishing to devote more of his leisure time to Entomology, desires to remind those Members not already using the method, of the advantages and economy, both to them and to the Society, of the payment of subscriptions by Bankers' Order.

The appropriate form can always be obtained from the Secretary or the Treasurer.

South London Entomological and Natural History Society

Statement of Accounts

BALANCE-SHEET at 31st December 1960

Capital Fund—		Investments at Cost—	
General	...	General (including Ashdown, Lachlan-Gibb, Lile, Robert Adkin, Fountaine, Hugh Main, Labouchere, Cockayne, Rait-Smith and Hawgood bequests).	£545 11 6
Publication	...	£591 15s 3d 3½% Conversion Stock ...	£417 17 0
Housing	...	£600 0s 0d 2½% Consolidated Stock ...	703 13 4
	£2,885 15 4	£850 0s 0d 4% Consolidated Loan ...	500 0 0
		£500 0s 0d 4½% Defence Bonds ...	271 16 0
		£400 0s 0d 3½% War Stock ...	350 0 0
		£350 0s 0d 5% Defence Bonds ...	
		Publication (gift of the late Misses E. F. and L. M. Chapman in memory of their brother).	
		£300 0s 0d 3½% War Stock ...	304 19 9
		Housing (including gift of Edgar Hare in memory of the late Edward Step).	
		£250 0s 0d 3% Savings Bonds, 1965-75	178 17 6
		Note.—Market value at 31st December 1960—£2,613	
		Cash at Bank—	
		Deposit Account ...	£508 6 6
		Current Account ...	114 1 10
		Cash in Hand ...	622 8 4
			8 16 7
			£3,904 0 0

Audited and found correct,

R. M. MERE,

G. STOUGHTON-HARRIS, F.C.A.

26th January 1961.

J. L. HENDERSON, Hon. Treasurer.

INCOME AND EXPENDITURE ACCOUNT—Year ended 31st December 1960

Rent of Rooms, etc.	...	...	...	£160 18 0	
Insurances	...	...	...	7 4 6	
Gratuities, Floral Tributes	...	...	...	4 3 0	
Secretarial Expenses	...	...	...	109 3 3	
Treasurer's Expenses	...	...	...	11 11 5	£993 0 2
<hr/>					
Subscriptions to Wicken Fen Fund, Footpaths Preservation Society, Ramblers' Association, National Trust Field Studies Council, Conservators of Oxshott Heath and Council for Nature	...	...	...	...	10 11 6
Annual Exhibition and Annual Dinner Expenses	...	...	...	...	12 6 5
Grant to Publication Fund	...	...	...	...	415 0 0
Balance being Excess of Income over Expenditure for the Year, carried to Balance Sheet	...	...	...	...	0 19 3
					<hr/>
					£731 17 4

CAPITAL ACCOUNT—Year ended 31st December 1960

[illegible]

LIBRARY FUND—Year ended 31st December 1960

[illegible]

PUBLICATION FUND—Year ended 31st December 1960

Deficit in Provision for 1958 issue of "Proceedings" Printing and Posting the "Proceedings and Transactions", 1959 £527 8 10		£30 2 6
BLOCKS AND PRINTING— Coloured Plates 98 2 7		
Half-tone and Line Plates 23 6 4		
Printing "Bye-Laws of the Society"	648 17 9	
Printing "Catalogue of Books in the Library"	38 19 7	
Printing Christmas Card designed by M. W. F. Tweedie	16 15 0	
Balance at 31st December 1960	32 6 5	
	0 19 8	
	<hr/>	
	£768 0 11	
Balance at 1st January 1960		£3 16 0
Sales of "Proceedings"		£21 9 6
Sales of "A Guide to the Smaller British Lepidoptera" and Supple- ment	17 1 5	
Interest—£300 0s 0d 2½% War Stock (the Misses E. F. and L. M. Chapman)		38 10 11
Donations		10 10 0
Grant-in-Aid from Royal Society		1 7 6
Sales of Christmas Cards		100 0 0
Grant from Current Income		28 16 6
Grant from Accumulated Revenue		415 0 0
		170 0 0
	<hr/>	
		£768 0 11

HOUSING FUND—Opened 1st March 1960—Period ended 31st December 1960

[illegible]

OBITUARIES

LEONARD TALMAN FORD

Leonard Talman Ford died at Bexley, Kent, on 9th January 1961, aged 81. He was educated at Dulwich College, and later went to Merton College, Oxford, where he obtained an honours degree in Chemistry. He was called to the Bar in 1906 and practised in Lincoln's Inn. Some time afterwards he joined the Civil Service and was Assistant Charity Commissioner when he retired in 1939. He was interested in the microlepidoptera, and was an acknowledged expert on this group. He specialized in the Stigmellidae and his skill in setting these minute moths was remarkable. Living all his life in the faunistically rich area of North-East Kent, he was able to rediscover a number of obscure species which had been lost or overlooked since Stainton's days, and by careful and accurate observations added considerably to our knowledge of their life-histories. He was an outstanding field-worker, and was most successful in breeding many difficult species from their early stages. He discovered two species new to science, *Coleophora erigerella* and *Nepticula marionella*. In 1946 the South London Entomological and Natural History Society published his revision of the British Psychidae. He became President of the Society for 1947-48, having joined in 1920, his Address being a review of the microlepidoptera which had been added to the British List since the publication of Meyrick's *Revised Handbook of British Lepidoptera* in 1928. In 1949 the Society published his main contribution, *A Guide to the Smaller British Lepidoptera*, being an account of the life-histories and foodplants of 1370 species of the microlepidoptera. In the 1952-53 *Proceedings* appeared a paper by him entitled *The Glyphipterygidae and Allied Families*. Leonard Ford has helped materially to increase the interest in the microlepidoptera, and we all regret the passing of a good naturalist. He leaves a widow, two sons and a daughter, to whom we express our sincere sympathy.

S. C. S. BROWN.

FREDERICK WILLIAM RUMSEY

(1885-1960)

Few members of the Society were better known to those who regularly attended both indoor and outdoor meetings than the late Mr. "Fred" Rumsey, who passed away after a sudden heart attack on 17th December 1960.

Born at Folkestone in 1885, he was introduced to entomology at an early age by his father, who was a keen collector of Lepidoptera. He became a carpenter and joiner by trade and worked for the late L. W.

Newman, a well-known entomological dealer, at Bexley from 1909 until the outbreak of war in 1914. With his love of entomology one can easily understand how this arrangement worked out to their mutual advantage.

In November 1914, Mr. Rumsey volunteered to serve in the Armed Forces and became a dispatch rider with the rank of Petty Officer Air Mechanic in the Royal Naval Air Service. Later this branch became amalgamated with the Royal Air Force, in which he served as First Class Air Mechanic.

On demobilisation in 1919 he worked for Vickers, near Dartford, and subsequently for several well-known building contractors. In 1926 he set up as a master builder at Banstead, Surrey, and continued in business for nearly 30 years until he retired a few years ago.

In 1954 he became a member of the Natural Historical Society of Sutton, Croydon, Purley, etc., a local society formerly called the Streatham Entomological and Natural History Society, of which F. W. Frohawk was at one time a member. The members of this Society used to take it in turns to have their meetings at the various members' houses, when happy times were spent together browsing over their respective collections and recalling episodes of entomological excursions in the past. His connection with the South London dates back to 1947.

In addition to the larger moths, Mr. Rumsey became very interested in the microlepidoptera some years ago and took many interesting species including *Heterographis oblitella* Zell. in Norfolk in 1953.

One of his great pleasures was to follow the Chiddingfold Farmers' Foxhounds on a bicycle. This interest was shared by the writer of this obituary notice and hundreds of miles of Surrey by-ways and bridle tracks must have been covered by us during our Saturday outings together over many years. Often these excursions brought to light some interesting entomological items, such as the discovery of a number of larvae of *Ostrinia* (*Anania*) *nubilalis* Hübn. in stems of *Artemisia vulgaris* L. on the high ground just south of Bramley, Surrey, and the finding of a colony of *Parascotia fuliginaria* L. at Selhurst Common, near Hascombe, where we once found the larvae fairly common on sawn birch trunks stacked by the roadside. These bicycle excursions invariably started from Guildford Railway Station, and it was at the start of one of these trips that he collapsed.

On more than one occasion the Society had a field meeting at Banstead, and those attending enjoyed tea at Warren Road, where all were made welcome by Mr. and Mrs. Rumsey and their two daughters at their house. An inspection of Mr. Rumsey's methods of rearing Lepidoptera was full of interest and his various original breeding cages were an inspiration to all.

For some years he bred numbers of *Lycia hirtaria* Clerck from a dark female captured at Walthamstow. Eventually by selective breeding he obtained a very fine black form which many members must have bred themselves from his stock. A number of cripples used to emerge, through inability to cast off the empty pupa shell, so he hit on the simple method of anchoring the "tail" of each pupa by glue to a piece

of cord sewn to a piece of sacking. He assured me this worked, and that the moths on emergence were able to drag themselves clear of the empty pupa case more easily. As well as all the other species which he bred he sometimes had five or six hundred pupae of the melanic *L. hirtaria* in a season. This will give some idea of the scale of his rearing activities.

In his last years he was really a very sick man, not that it was noticeable from his manner and enthusiasm for outdoor recreation. In 1959 he had a serious illness and was in hospital for some months. Those who knew him well realised that he had never really got over this illness, but he was able to attend most of the 1960 Field Meetings, thus renewing old friendships and making new ones.

His friendly and helpful nature endeared him to those with whom he came in contact, and he is missed by all who knew him, especially perhaps by the younger members to whom he was always helpful and understanding.

S. W.

ELEVENTH INTERNATIONAL CONGRESS OF ENTOMOLOGY*held in Vienna from 17th to 25th August 1960**Report by Dr. C. G. M. DE WORMS*

Vienna was indeed a happy choice of venue for this Congress; being in the centre of Europe it brought together a very large number of delegates from all adjoining countries, as well as from many lands overseas. In fact, some 1,750 persons attended from all the leading nations, outnumbering those who were at the 1956 Congress in Montreal. As was to be expected, the Iron Curtain countries were very well represented, with delegations from Russia, Hungary, Czecho-Slovakia, Roumania and Poland. On the morning of 17th August the Congress was formally opened by the President, Professor Dr. Karl Schedl, in the presence of a very distinguished gathering which included the Austrian Minister of Agriculture and the Rector of Vienna University. The ceremony was held in the Great Hall of the Hofburg, the former Royal Palace, and in the warm sunshine delegates had the opportunity of seeing some of the most imposing buildings bordering the Ringstrasse in the vicinity. Thereafter, for the rest of the Congress the Old University building on the Ringstrasse served as headquarters. It was there that the majority of the papers were read. The subjects were divided into 14 sections, the first of which was divided into seven sub-sections, chiefly connected with some of the main Orders of insects. The other sections embraced a very wide range of subjects such as Morphology and Anatomy, Genetics, Geographical Distribution, Social Insects, Agricultural Entomology, Forest Entomology, Medical and Veterinary Entomology, Beekeeping, Insect Parasites and Viruses, and Pathogenic Organisms. On these subjects no less than 620 papers were submitted, and most of them read. A further 110 papers were read at 17 symposia, covering such subjects as Insect Acoustics, the Migration of Locusts, the Chemistry of Insects, Chemical defensive Mechanisms in Arthropods, the Transmission of Disease by Ticks, etc., the Economic status of Pests, Insecticide Resistance, Plecoptera, Odonata, and Systematic Nomenclature. In addition 36 films were shown on matters of special entomological interest.

Always a very welcome feature of these Congresses is entertainment, both indoors and in the country, and this is carried out on quite a lavish scale. On the opening evening, 17th August, all delegates were invited to a reception which was held in the Grand Salon of the fine Rathaus where the Bürgermeister was host. This was a most delightful evening which ended with dancing and was supplemented by a large and elaborate buffet. On subsequent evenings a number of leading delegates were received by various important Government officials, while on several afternoons there were meetings of delegates interested in special branches of entomology or insect Orders. A special reception was

held on 24th August in the fine Museum of Natural History, with its marble staircases and ornamental ceilings. The museum was again opened to delegates on the last evening of the Congress which had its closing meeting in the Auditorium of the University on the morning of the 25th.

The outdoor meetings and excursions were most popular, since the weather was mainly very fine and warm. Most of the visitors had an opportunity of seeing some of the sights of the City itself, in particular the famous Schönbrunn Palace and other fine buildings and places of interest. A good many excursions were arranged further afield, and on Saturday, 20th, three were on the programme. They took the form of a large field meeting transported by motor coaches in which those interested in various insect Orders travelled together. Three collecting areas were visited. One was in the vicinity of the Neusiedler See, the most westerly European salt lake, which lies about 30 miles south-west of Vienna and is some 20 miles long by five miles wide, but is nowhere deeper than 4 feet. It is a great haunt of rare birds and of some scarce species of Lepidoptera. This excursion also included a visit to the edge of the great Hungarian plain. Another trip visited the Rax, a high mountain range of about 7,000 ft., not far from the Semmering Pass, 60 miles to the south of Vienna; and the third took participants along the Danube valley to Hainburg, only four miles from the Czecho-Slovak border. The day was very fine and good catches of insects were made by all who wished to indulge in fieldwork.

On Sunday, 21st August, a visit was paid to the large and well-known Monastery at Melk, which contains a wealth of art treasures, after which the large party embarked on a steamer which took them through the valley of the Wachau. A number of stops were made, notably at Aggsbach and Dürnstein, the scene of the imprisonment of Richard Coeur de Lion. Here the party was welcomed by a local choir in festive costumes. During the week several other special excursions were made by sections to study some subject closely connected with the interests of the section concerned. There was a visit to the Wienerwald to see a bee-keeping institution, and another to study Forest entomology in this region, also trips to silo-making organisations and to a chemical firm near Krems.

Three larger excursions were arranged to take place after the Congress, one covering three days with headquarters at the biological station at Lunz-am-See and coincided with a heat wave, whilst the other two lasted just over a week and toured the alpine regions of Austria.

All who went to Vienna for this Congress were impressed with the kindness and great hospitality shown by their Austrian hosts and the people in general. They came away feeling that they had attended a most instructive and enjoyable gathering, where many friendships had been made and many others renewed.

It was announced that the next Entomological Congress would be held in London in 1964.

ABSTRACT OF PROCEEDINGS

INDOOR MEETINGS

11th FEBRUARY 1960.

The PRESIDENT in the Chair.

Mr. A. C. Cramp was declared elected a member.

EXHIBITS.

Mr. B. GOATER—Forms of *Polia nebulosa* Hufn. (Lep., Noctuidae) from the west of Britain (f. *pallida* Tutt); Hants; N.W. London; the Midlands; and Delamere Forest, Cheshire (f. *robsoni* Collins, heterozygous melanic, and f. *thompsoni* Arkle, homozygous melanic). The series showed a range of variation from nearly white to black. Mr. Goater pointed out that the three dark grey forms, from London, the Midlands and Cheshire (*robsoni*), appeared to be genetically distinct from one another and he suggested that all were heterozygotes. The Cheshire specimens were taken in 1910 and since little seems to have been heard of them since, he queried whether these melanics were now extinct.

Dr. C. G. M. DE WORMS—A photograph depicting a specimen of *Heliothis nubigera* H.-S. (Lepidoptera), a noctuid new to the British Isles, taken at Sheringham, Norfolk, 29.v.58, by Mr. P. R. Clarke. The species has a much more eastern range than either *H. peltigera* Schiff. or *H. armigera* Hübn., being found in Palestine, Egypt, and around the Red Sea to the borders of India. Its appearance approximates much more to that of *H. armigera* with which Mr. Clarke confused another specimen of *H. nubigera* he took a few days after the one in the photograph shown. Yet a further example was taken in Dorset in early May 1958 at the time of a big immigration of *H. peltigera*.

Mr. T. R. EAGLES—The fungus *Sarcoscypha coccinea* (Jacq. ex Fr.) Cooke from near Salisbury, Wilts. He quoted Masee, 1911, *British Fungi*, p. 496: "Readily known among the large stalked Pezizae by the brilliant coloured disc with an entire edge and the whitish outside and stem. One of the most beautiful of our indigenous fungi, and not by any means uncommon, but often passed unobserved as it is in perfection during the late winter and early spring. It is collected in the woods in the district of Scarborough, and sold, along with a setting of moss, as a table decoration".

Mr. A. E. GARDNER—(1) A preserved larva of *Heliothis armigera* Hübn. (Lep., Noctuidae) from a tomato bought locally by Mr. E. W. Classey at Feltham, Middx., January 1960. (2) Drawings of the egg and

early instars of *Lestiniogomphus africanus* (Fraser) (Odon., Gomphidae). Eggs were obtained from females taken at Kuru, N. Nigeria, by Mr. R. M. Gambles in June 1955. On immersion in water it was found that a filament approximately 30 mm. in length became uncoiled from the posterior pole of the egg. It is thought that the filament serves to anchor the egg in the streams chosen by this species in which to breed.

COMMUNICATIONS.

Referring to Mr. Goater's exhibit, Dr. B. J. MacNULTY said he had worked the Delamere Forest extensively from 1946-48 without meeting either of the two forms shown. Dr. DE WORMS expressed the opinion that the form *thompsoni* Arkle was always bred and never taken in the wild. Mr. T. G. HOWARTH was of the same opinion.

Mr. K. A. SPENCER said that he had recently done a little collecting in Ceylon and that the mountains in this island have distinct Palaearctic affinities in their fauna. Mr. HOWARTH said that in almost all parts of the world, particularly in Africa, higher altitudes in mountains have a very distinct fauna. Mr. J. L. Messenger, who had also collected in Ceylon, said there is a vanessid and a fritillary which are very close to ours, but these were the only two cases which immediately came to mind. The affinity was, however, much more marked botanically.

A talk on "The British Seedbeetles (Col., Bruchidae)" was given by Mr. B. J. SOUTHGATE, who illustrated the talk with lantern slides.

25th FEBRUARY 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs. J. K. Cramp, J. A. Lorimer, A. A. Myers, G. M. Kingsbury and D. Rowberry. Mr. R. L. E. Ford was declared re-admitted to membership.

EXHIBITS.

Mr. J. L. MESSENGER—Examples of up-country butterflies taken in Ceylon, 1942-5, in connection with some comments made by Mr. K. A. Spencer at the previous meeting. The species shown were: *Papilio helenus* L. s.sp. *mooreanus* Rothschild, *Danais fumata* Butler, *Argynnis hyperbius* Joh. s.sp. *taprobana* Moore, *Vanessa indica* Herbst s.sp. *nubicola* Fruhst., and *Ypthima avanta* Moore s.sp. *singala* Fd.

Dr. B. J. MacNULTY—A pair of *Thymelicus lineola* Ochs. (Lep., Hesperidae) taken on a field meeting at Brockenhurst, Hants, 2.vii.50, with the spot on the underside of the tips of the antennae appearing to be a deep dirty maroon instead of the normal black.

Mr. T. R. EAGLES—(1) Portions of fronds of the ferns *Dryopteris borreri* Newm. and *D. filix-mas* (L.) Schott. He explained the difference between the two and referred to Pugh, J.P., 1953, *Watsonia*, 3: 57. (2) The lichen *Baeomyces roseus* Pers. (3) The moss *Orthodontium*

lineare Schwaegr., a fairly recent arrival in Britain now widespread.
(4) The hepatic *Lepidozia reptans* (L.) Dum. All from Leith Hill, Surrey.

COMMUNICATIONS.

Dr. H. B. D. KETLEWELL gave a talk illustrated by coloured slides and by a coloured cinematograph film on "Insect adaptation in Brazil with special reference to Darwin's visit".

Following the talk questions and discussion were primarily directed around African similes to the points Dr. Kettlewell made. Replying to a question regarding melanism in Brazil, Dr. Kettlewell said he had always been looking for melanism in tropical regions. In the environments of such places as Bombay and Calcutta where one might reasonably expect to encounter industrial melanism, he had failed to find it. He suggested that the advantages of melanism could, in the tropics, be out-weighed by the disadvantage of heat absorption.

10th MARCH 1960.

The PRESIDENT in the Chair.

The following members were declared elected: Messrs. K. C. Side, H. W. Macworth-Praed, and J. Clegg.

EXHIBITS.

Mr. T. R. EAGLES—A flowering spray of *Daphne laureola* L. (Spurge Laurel) from Enfield, Middx.

Mr. A. E. GARDNER—The following species of Odonata taken by Dr. B. J. MacNulty in Nigeria, all of which were apparently new to that country: *Gomphidia balli* Fraser (male), *Porpacithemis dubia* Fraser, both from the Sobo Plain, near Sapele, 25-30.xi.57, and an undescribed female *Teinobasis* sp. from the Assob Falls, taken in November 1957.

Mr. M. G. MORRIS—Some interesting weevils (Col., Curculionidae) taken in Kent. (1) ex F. T. Grant coll., *Otiorrhynchus porcatus* (Herbst), discovered by Grant at Gravesend; the exhibitor knew of no other Kent locality. *Lixus paraplecticus* (L.), discovered in Kent by Dr. A. M. Massee, that exhibited being one of his specimens. *Epipolaeus caliginosus* (F.), a species associated with hops, and widespread in Kent. (2) Taken by the exhibitor during 1959: *Apion waltoni* Steph., *A. spencei* Kirby, *Ceuthorhynchus depressicollis* (Gyll.), and from East Malling *Polydrusus sericeus* (Schall.) of which there seems to be no Kent record in the literature, though it has been taken for many years at East Malling by Dr. Massee and has been taken by the exhibitor at Shoreham also.

Mr. A. A. MYERS—A female *Cosymbia puppillaria* Hübn. (Lep., Geometridae) taken at mercury vapour light at Kingsbury, N.W. London, 16.x.59; and a female *Euphyia cuculata* Hufn. (Lep., Geometridae) from the same locality, 8.vii.59. He read a note.

Dr. B. J. MACNULTY—Two drawers of Nigerian Lymantriidae to illustrate his talk.

COMMUNICATIONS.

Several members reported that many of the early spring Lepidoptera were on the wing and some, such as *Achlya flavicornis* (L.) (Lep., Thyatiridae) were plentiful.

Dr. B. J. MACNULTY gave a talk, illustrated by specimens and the epidiascope, on Nigerian Lymantriidae with special reference to their larvae. Several species which were new to science, and others whose larvae were hitherto undescribed, were mentioned.

Afterwards, in reply to questions, Dr. MACNULTY said that the Nigerian Lymantriidae he had studied seemed fairly free from parasites, the chief of which appeared to be certain Platyhelminthae and fungi. Many of the larvae caused urtication.

24th MARCH 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Air Vice Marshall P. S. Blockey, C.B., C.B.E., B.A.; Messrs. T. K. Bailey, A. D. Wilkinson, and J. B. Tatum.

EXHIBITS.

The PRESIDENT—Six examples of *Diarsia festiva* Schiff. (Lep., Noctuidae) from Tresco, Scilly Isles, closely resembling the Scottish form, consisting of both bred and feral specimens.

Mr. J. L. HENDERSON—A large male *Mesosa nebulosa* (F.) (Col., Cerambycidae), brought by a neighbour to our President at Chiddingfold, Surrey, 10.iii.60. The beetle was thought to have emerged from wood fuel cut from trees grown on the estate; this species emerges from pupa at least three months before leaving the pupal chamber and presumably the warmth of the house prompted the early emergence.

Mr. B. GOATER—A tick, *Ixodes reduvius* (Acarina, Ixodidae) normally associated with sheep, taken from the ear of a cat in Somerset.

Mr. J. L. MESSENGER—Short series of three successive generations of *Nycterosia obstipata* F. (Lep., Geometridae) descended from a female taken at Tresco, Scilly Isles, 18.ix.59. Whilst the females showed little variation apart from a tendency for the discal spot to be dull or obscured, the second and third generations of males were much more lightly marked than the first, and the central fascia was often broken or reduced to one or two spots instead of being entire.

Dr. A. M. MASSEE—Examples of *Corizus hyoscyami* (L.) (Hem., Rhopalidae). The host plant of this rhopalid bug does not seem to be

generally known to the hemipterists of this country. The host plant is in fact *Erodium cicutarium* L. (Storksbill). In 1959 he bred some 50 specimens of this bug on Storksbill, and the immature stages were not interested in either *Galium* or *Ononis* which in the past have been said to be host plants. Specimens collected at Harlech, Mer., many years ago, were also bred on storksbill.

Mr. A. E. GARDNER—The following specimens of Odonata: (1) *Aeshna juncea* (L.) (Aeshnidae), two females of the all-blue form and one with typical coloration, caught 1-12.viii.59, Insh, Inv. (2) *Enallagma cyathigerum* (Charp.) (Coenagriidae), an aberrant male in which the abdominal colour pattern resembles *Coenagrion hastulatum* (Charp.), Loch an Eilean, Inv., 1-12.viii.59.

Mr. T. R. EAGLES—Twigs of *Aesculus hippocastanum* L. (Horse-chestnut) and *Ailanthus glandulosa* Desf. (Tree of Heaven). He drew attention to the fact that both had large leaf scars with marks suggesting the nails of a horse-shoe.

Mr. S. WAKELY—Leaves of *Phyllitis scolopendrium* (L.) Newm. (Hart's-tongue Fern), found by Dr. E. Scott at Westwell, near Ashford, Kent, showing among the sori mines and feeding places of the larvae of the local moth *Teichobia verhuellella* Staint. (Lamproniidae). Specimens of the moth from his collection were also shown. He commented on the way the mining larvae carried the sori with them, even right up to the midrib of the leaf, though he could offer no explanation of how this was accomplished.

COMMUNICATIONS.

Commenting on the President's exhibit, Dr. C. G. M. DE WORMS said he had seen no examples of *Diarsia festiva* Schiff. closer to those one finds on Unst, Shetland Isles.

The PRESIDENT said he had recently had *Orthosia miniosa* Schiff. (Lep., Noctuidae) in his mercury vapour trap at Chiddingfold, Surrey. *Agrotis ipsilon* Hufn. (Lep., Noctuidae) had also occurred sporadically. *Gypsitea leucographa* Schiff., *Dasyampa rubiginea* Schiff. and *Orthosia gracilis* Schiff. (Lep., Noctuidae) were recorded by Mr. J. L. MESSENGER.

Dr. A. M. MASSEE said that *Anthocoris limbatus* Fieb. (Hem., Anthocoridae) was already out, a remarkably early date.

Mr. T. N. D. PEET said he had obtained a melanic *Polyploca ridens* F. (Lep., Thyatiridae) and added that Dr. Kettlewell would like further information on melanism in this species. In answer to the question how melanism affected this moth, he said the white is a dull brown-green. Mr. S. WAKELY said that Mr. Fairclough had been taking a similar form at mercury vapour light at Leigh, Surrey, whilst Dr. DE WORMS said the form was not uncommon at Woking, Surrey. The PRESIDENT added that one of the forms of this species he had obtained had the tendency Mr. Peet described, but he would not have called it melanism. It was generally thought the form Dr. Kettlewell was interested in was something different from those mentioned.

14th APRIL 1960.

The PRESIDENT in the Chair.

Capt. J. Ellerton, D.S.C., R.N., was declared elected a member.

EXHIBITS.

The PRESIDENT—Three examples of *Polyplocia ridens* F. (Lep., Thyatiridae) as a result of the discussion at the previous meeting, and representing what were, in his experience, the three “standard” forms in this species.

Mr. T. R. EAGLES—(1) The fungus *Pholiota aurea* (Mattusch.) Fr., from Bookham, Surrey, 10.iv.60. (2) On behalf of Mr. W. H. SPREADBURY, *Cochlearia danica* L. (Danish Scurvy Grass) in flower, from Newhaven, Sussex.

COMMUNICATIONS.

The SECRETARY read the regulations, approved by the Council, of the new Housing Fund.

The LIBRARIAN reported that Mr. P. Siviter Smith had presented five important separates to the library.

Commenting on the *Teichobia verhuellella* Staint. (Lep., Lamproniiidae) exhibited at the previous meeting, Mr. S. N. A. JACOBS said one of the larvae, now in his possession, had left the mine in the leaf, had travelled across the top of the leaf, and up the side of the box, still carrying its case containing the sori. An interesting fact concerning this species is that it does not construct its case until it leaves the mine.

Mr. Jacobs also reported a young thrush which he had observed sitting in a gooseberry bush two evenings previously. It was thought that the recent warm weather had been responsible for the bird's parents encouraging it from the nest at such an early date.

Members were asked by Miss W. M. A. BROOKE if they would watch for the dipterous larva *Arthrocnodax wissmanni* Kieffer (Cecidomyiidae), an ectoparasite on the mite *Vasates schlectendali* (Nalepa), which occurred on the underside of neglected apple leaves. It had been recorded in 1931 and, as far as she was aware, had not been recorded since. Dr. A. M. MASSEE said the fly had occurred regularly since then and at times was quite common in derelict apple orchards.

Mr. E. J. HARE, C.B.E., F.R.E.S., gave an interesting and amusing account of his “Recollections of early Members”.

28th APRIL 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Mrs. G. H. Mansell, Messrs. P. le Masurier, C. G. Mansell, and H. N. A. Willcox.

EXHIBITS.

The PRESIDENT—Aberrations of four species of noctuid moths: *Amathes xanthographa* Schiff. from Feltham, Middx., and *Orthosia cruda* Schiff., *Leucania impura* Hübn. and *Agrochola lychnidis* Schiff. from Chiddingfold, Surrey.

Mr. M. W. HARPER—(1) A bred series of *Rhodometra sacraria* L. (Lep., Geometridae) from a female immigrant taken 31.viii.59 at Worthing, Sussex. Thirty-one eggs were laid and all the larvae were fed on *Polygonum aviculare* agg. (Knotgrass) at room temperature, one only being lost. The larvae pupated between 4th and 5th October and the pupae were separated into three batches. The first batch consisted of six pupae incubated at a temperature of 35-40° C., which approximates blood heat (37° C.). When they emerged, between 14th and 16th of the same month, these all produced fairly normal forms; three ab. *labda* Cramer and three ab. *atrifasciaria* Stefan. The second batch of 14 pupae were maintained at room temperature, 17-18° C., and these emerged between 24th October and 11th November. All except one had the brown oblique stripe as in ab. *atrifasciaria* Stefan, but all of them had the background colour fulvous rather than yellow. The third batch of ten pupae were mainly kept at a temperature of 3-4° C., but were warmed to room temperature for short periods, and emerged between 17th November and 10th December. Three of the resulting imagines were moderately severely crippled, no doubt due to the low temperature, but the seven remaining specimens expanded satisfactorily. Six of these showed a marked melanistic background of greyish-brown, with the darker brown stripe superimposed. It is perhaps remarkable that the remaining specimen from this batch, and also the only specimen out of 30 imagines proved to be an extreme form of ab. *sanguinaria* Esp., and in only one other specimen was there any trace of pink pigmentation. (2) A single specimen of *Operophtera brumata* L. (Lep., Geometridae) taken in Epping Forest, Essex, 23.xi.59. The specimen is probably an intersex; the antennae are not pectinate, but both fore and hindwings on the right side are much enlarged. The left forewing is a little enlarged from the normal female pattern.

Mr. T. G. HOWARTH—(1) A pair of the oriental theclid butterfly *Favonius ultramarinus* Fix., of which he gave the following details. The genus *Favonius* (Sibatani & Ito) is closely related to *Quercusia* (Verity), the genus to which *quercus* L., the Purple Hairstreak, now belongs. *Favonius* contains some half dozen species, none of them coming further west than Yunnan, W. China, the majority occurring on the islands of Japan and the adjacent mainland. The species exhibited is typical of the genus in being sexually dimorphic, the male having the upperside metallic green and the female being brown with a paler post discocellular patch. (2) On behalf of Mr. T. J. Honeybourne, four species of lycaenid (Lep.) larvae bred from ova from Japan as follows: *Wagimo signata* Butler, *Favonius cognatus* Staud., *F. ultramarinus* s.sp. *hayashii* Shirôzu and one undetermined.

Dr. A. M. MASSEE—A series of *Hypocoelus oxelai* Palm. (Col.,

Eucnemidae), a local and uncommon species. The beetle was first discovered in this country by Dr. H. Lindberg who captured a single example at Box Hill, Surrey, 21.vii.51. Several more were taken at the end of August 1954 in a dead standing beech at Otford, Kent, by Mr. A. A. Allen. The exhibitor obtained his specimens in the same locality, also in dead standing beech, taking the first examples 14.vii.57. Specimens were presented to the Society.

Mr. M. G. MORRIS—Living and set examples of *Polydrusus* (*Metallites*) *marginatus* Steph. from the East Malling, Kent, district. This weevil is described as very local by Joy, and very local but not uncommon where it occurs by Fowler. It occurs in abundance on birch and other trees in the locality in April and May. Although Fowler says it is taken on broom, *P. marginatus* is absent from this plant, which is plentiful under the birches from which the exhibited specimens were obtained.

Mr. S. WAKELY—(1) Larvae of *Eidophasia messingiella* F.R. (Lep., Plutellidae) taken on *Cardaria draba* (L.) Desv.; hemlock stems containing larvae of *Lozopera beatricella* Wals. (Lep., Tortricidae); and larval cases of *Nemotois fasciella* F. (Lep., Adelidae) taken at the roots of *Ballota nigra* L., all from Stanford-le-Hope, Essex. (2) Larvae galls of *Aegeria flaviventris* Staud. (Lep., Sesiidae) from the Effingham, Surrey, field meeting. (3) Specimens from his collection of *Lozopera beatricella* Wals., *Eidophasia messingiella* F.R., *Bucculatrix maritima* Staint. (Lep., Lyonetiidae) and *Nemotois fasciella* F., bred in previous years from larvae taken at Stanford-le-Hope, and *Aegeria flaviventris* Staud., from Effingham.

COMMUNICATIONS.

The SECRETARY reported on behalf of the Librarian that Dr. A. M. Massee had presented a copy of his book, *The Pests of Fruits and Hops*, to the Library.

A discussion took place on the aberrations of *Rhodometra sacraria* L. during which experiments conducted by Dr. E. A. Cockayne were recalled.

All the local lepidopterous specialities which one might expect at Aviemore, Inv., during Easter, had been seen. *Odontosia carmelita* Esp. (Notodontidae) and *Orthosia gracilis* L. (Noctuidae) were reported from the Carlisle, Cumberland, area. It was thought that most lepidoptera were out to time, but *Amathes alpicola* Zett. (Noctuidae) seemed to be scarcer than usual.

Mr. C. N. HAWKINS reported *Celastrina argiolus* L. (Lep., Lycaenidae) in his garden at Wimbledon, Surrey. He also reported *Aglais urticae* (Lep., Nymphalidae) and *Pieris rapae* L. (Lep., Pieridae) and added that he had seen four young Mistle-thrushes.

Mrs. J. O. I. SPOCZYNSKA, who had been to Hayling Island, Hants, said she had seen the Great Grey Shrike there and also a bird resembling a small Yellow Hammer which she could only determine as a Yellow Breasted Bunting, but as the locality was so unusual the determination was in some doubt.

12th MAY 1960.

The PRESIDENT in the Chair.

Dr. G. Bernardi, a distinguished visitor from the Paris Museum, was welcomed by the President.

Mr. A. F. Phillips was declared elected a member.

EXHIBITS.

Mr. A. H. SPERRING—Feral larvae of *Aporophyla lunula* Stroem (*nigra* Haw.) (Lep., Noctuidae) of both the purplish-brown and green forms, and larvae of *Selidosema brunnearia* Vill. (Lep., Geometridae).

Mr. T. R. EAGLES—Galls of the agamic form of *Biorhiza pallida* Oliv. (Hym., Cynipidae), found at Effingham, Surrey, 16.iv.60. The alternate sexual generation makes the large highly-coloured oak apple.

COMMUNICATIONS.

Spring butterflies were reported to be plentiful in Kent the previous week-end, particularly *Celastrina argiolus* L. (Lycaenidae), and since then *Clossiana (Argynnis) euphrosyne* L. (Nymphalidae) had been seen. Many of the Sphingidae were also reported to be out; the PRESIDENT had caught *Mimas tiliae* L. in his mercury vapour light trap at Chiddingfold, Surrey, and he added that *Hyloicus pinastri* L. had been out in April.

Dr. C. G. M. DE WORMS said he had recently visited Dungeness, Kent, and so far little of the collecting area had been affected by the nuclear power station project, though to date work on the power station itself had not begun.

Celastrina argiolus L. was stated to be common at Wimbledon, Surrey, but all the examples examined had been males. However, a female was reported from Rannmore, Surrey.

H. E. HINTON, B.Sc., PH.D., F.R.S., F.R.E.S., read a paper "How some insects, especially the egg stages, avoid drowning when it rains", which he illustrated by projected drawings and which provoked a great many questions (see p. 130).

26th MAY 1960.

A Vice-President, Mr. F. T. VALLINS, A.C.I.I., F.R.E.S., in the Chair.

Monsieur Jacques Plantrou, a prominent entomologist from Paris, was welcomed to the meeting by the Chairman.

The death was announced of Mr. D. J. Gordon.

EXHIBITS.

Mr. J. L. HENDERSON—A series of *Acalyptus carpini* (F.) (Col., Curculionidae) beaten from sallow catkins at Wicken Fen, Cambs., 2.v.60. He gave brief details of previous records.

Dr. A. M. MASSEE—The eggs of *Petrobia latens* Müller, a tetranychid mite closely related to the Bryobia Mite, the Greenhouse Red Spider Mite and the Fruit Tree Red Spider Mite. Its hosts are mainly monocotyledonous plants such as onions, iris, wheat, barley, gladiolus, and

grass. The Kentish specimens were recorded from cherry, plum and grass. *P. latens* reproduces parthenogenetically, and males are unknown. The summer eggs are red and spherical, but the overwintering eggs are coated with a white material and in shape have the appearance of miniature pork pies. These white eggs are deposited on stones and other debris, and occasionally on the lower portions of tree trunks. Sometimes swarms of adults invade houses where they disperse from grass growing nearby on which they feed. Distribution is world-wide, the mite being known from Europe, N. Africa, Australia and N. America. In England it has been recorded from Kent, Gloucestershire, Worcestershire, Hertfordshire and London.

Mr. T. G. HOWARTH—A sprig of cultivated broom from his garden at Arkley, Herts., exhibiting fasciation to a marked degree.

Mr. T. R. EAGLES—(1) Galls of *Rhodites mayri* Schlech. (Hym. Cynipidae) on *Rosa rubiginosa* L. from Buckland, Surrey, 1.v.60. (2) A variety of *Cosymbia albipunctata* Hufn. (*pendularia* Clerck auct. nec Clerck) (Lep., Geometridae) heavily suffused with pink, bred from larvae beaten from birch at Tilgate, Sussex, 1959.

Mr. F. D. BUCK—A series of *Librodor hortensis* (Geof.) (Col., Nitidulidae) from Wood Walton Fen, Hunts., taken at various times in heaps of vegetable litter. He pointed out that this insect was more usually taken on blossom or at sapping tree trunks.

Mr. S. WAKELY—Two larvae of *Lithophane leautieri* Boisd. (*lapidea* Hübn. auct. nec Hübn.) which had been taken in the Isle of Wight, Hants, by Mr. J. Lobb. They were obtained by beating a tall cypress tree over a sheet at 10 p.m. with a pole some 15 ft. long. This is the first time the larva of this insect has been taken in the wild in this country. A discussion revealed that the young larvae feed only on the male flowers which occur high on the tree. When the flowers are no longer available the larvae feed on fresh growth. Early attempts to breed the moth from ova failed because this fact was not realised.

Mr. A. E. GARDNER—Series of the following species of Coleoptera: from Monks Wood, Hunts., 15.v.60, *Osphya bipunctata* (F.) (Melandryidae), *Ischnomera caerulea* (L.) (Oedemeridae), and *Anaglyptus mysticus* (L.) and *Rhagium mordax* (Deg.) (Cerambycidae); from Wood Walton Fen, Hunts., 1.v.60, a series of *Badister sodalis* (Dufts.). He also exhibited some foreign journals of particular interest.

COMMUNICATIONS.

The LIBRARIAN reported the following gifts to the library: (1) Fascicle 4 of *Alexanor*, Tome 1., given by Mr. S. N. A. Jacobs. (2) A complete set of the Penguin "New Biology", Nos. 1-31 to be bound at the expense of the donor, Mr. A. H. Sperring. (3) A signed copy of his book on Orchard Pests presented by Dr. A. M. Massee.

A discussion took place on botanical fasciation and another on the variation of secondary sexual characters in Coleoptera in relation to size.

A large number of queen wasps were reported, which augured ill for the autumn; and the dipterous Syrphidae also appeared to be numerous.

Dr. A. M. MASSEE said he had found *Odontoscelis dorsalis* (F.) (Hem., Pentatomidae) during the past week-end on Witley Common, Surrey, feeding on *Erodium*, and though there seems to be some doubt about its food-plant, the larvae taken home were feeding quite happily on it.

From the Brighton, Sussex, area Mr. R. C. DYSON said he had taken *Odontosia carmelita* Esp. (Lep., Notodontidae) at light about six miles out of the town, just off the chalk and getting onto the weald. *Apatele alni* L. (Lep., Noctuidae) had recently occurred at sugar, also in the Brighton area, where the mercury vapour light had failed to produce it.

Mr. C. N. HAWKINS mentioned a sawfly in his garden at Wimbledon, Surrey, which in the past had been subject to a heavy infestation by a mite. Successful efforts had been made to clear the tree of the pest and it had remained free for some two years, but now the mite was returning. He raised a query regarding the mite's method of dispersal. Dr. MASSEE said the mite, an eriophyid, is wind-borne. It is very small indeed, has only two pairs of legs just behind the head, no wings, and a curious sucker "foot" at the anal end. With this "foot" it is able to stand on end; then bends its body into a U-shape, and by snapping itself upright and releasing the sucker it is thrown into the air.

9th JUNE 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Dr. G. Bernardi, Major A. Russell, Messrs. Ian Ebbage, E. S. Bradford, A. Smith, and W. G. Tremewan.

EXHIBITS.

Mr. W. H. SPREADBURY—*Utetheisa pulchella* L. (Lep., Arctiidae) taken at Seaford, Sussex, 15.v.60.

Mr. T. N. D. PEET—A melanic *Polyploca ridens* F. (Lep., Thyatiridae) as a result of the discussion on the dark forms of this insect on 24th March (see p. 5). The specimen shown was taken at Harpenden, Herts., 19.iv.57. On examining the insect the President said this example was more uniformly dark than any he had seen.

Mr. T. G. HOWARTH—A male example of *Papilio bianor* Cr. s.sp. *dehaani* Feld. (Lep., Papilionidae) taken in Korea in 1945 and two drawings of a larva of this species made at that time. The larva was found on 9th September on a small thorny shrub, possibly *Phellodendron amurense* Rupr., after watching a female ovipositing. The larva in its first two or three instars resembled a bird dropping, being brownish-black with white markings. Later it changed to a privet green colour with darker bars and stripes, it spun up on 18.ix.45, pupated on 22.ix.45, and emerged on 25.iii.46 (1951, *Proc. S. Lond. ent. nat. Hist. Soc.*,

1949-50: 103). He also exhibited on behalf of Mr. T. J. Honeybourne four living larvae of the above species bred from ova from Japan. These were in the "bird dropping" stage and were feeding on *Choisya ternata* Kunth.

Mr. T. R. EAGLES—(1) A pupa of *Pterophorus (Alucita) pentadactylus* L. (Lep., Pterophoridae) from Enfield, Middx. (2) Leaves and flowers of *Rhynchosinapis wrightii* (O. E. Shulz) Dandy (The Lundy Cabbage) from Lundy Island.

COMMUNICATIONS.

A further example of *Utetheisia pulchella* L. was reported to have been taken at Dungeness, Kent.

The PRESIDENT, who had recently returned from a visit to Russia, said butterflies did not appear to be common there. *Pieris brassicae* L. and *P. rapae* L. (Pieridae) were seen, and he also noticed what he thought to be *Celastrina argiolus* L. (Lycaenidae).

In a letter to Mr. S. WAKELY, Dr. J. V. Dacie said the *Aegeria flaviventris* Staud. (Lep., Sesiidae) taken at Effingham, Surrey, on 16th April had already emerged. Mr. WAKELY said he had never had this insect out before 1st July; but in response to a question he said that Dr. Dacie had kept the insects indoors.

Mr. R. A. FRENCH, B.Sc., F.R.E.S., gave a talk on "Insect Migration", using the lantern for illustrations. The talk was followed by a lengthy discussion centring mainly around the migration of *Danaus plexippus* L. (Lep., Danaidae) and the movements of Lepidoptera within these islands.

23rd JUNE 1960.

A Vice-President, Mr. F. T. VALLINS, in the Chair.

The following new members were declared elected: Messrs. J. E. Plantrou, R. J. Seacome, D. M. Lloyd, R. Hayward, and C. A. Wraight.

EXHIBITS.

Mr. M. W. F. TWEEDIE—Photographs showing how a caterpillar climbs up its thread. He quoted Professor Alexander Klots as stating the caterpillar eats its thread as it climbs. His own observations and photographs did not bear this out, though he was prepared to accept that more than one method may be used in different families. It would appear, he said, that the caterpillar having fallen on its thread and checked its fall, then separates the thread from its spinnerets and clasps it against its thorax. Next, reaching upwards with its head, it takes the thread in its mandibles and, with a circular sweep of its head, makes a loop of thread round its legs, thus raising itself on the thread. By repeating this movement of the head and transferring the thread to its legs at the end of each movement it proceeds upwards, collecting a ball of 'silk' between its legs as it goes. As each ball of 'silk' becomes inconveniently large it is released and another started, the ball becoming eventually detached by its own weight. This method had been

observed in *Ligdia adustata* Schiff. (Geometridae) and in *Malacosoma neustria* L. (Lasiocampidae); in view of the diverse characteristics of these two insects it would appear that this method was quite widespread in the Lepidoptera. Mr. S. Wakely agreed with Mr. Tweedie's observations and said nearly all the Geometridae and Tineidae used this method. Mr. M. G. Morris, who knew somebody working on this aspect of larval behaviour, said his acquaintance suggested there were two different methods used by lepidopterous larvae to climb their thread, but he could give no details.

Mr. S. WAKELY—(1) Two full-fed larvae of *Lithophane leautieri* Boisd. (Lep., Noctuidae) from cypress on the Isle of Wight, which had been shown previously in earlier instars on 26th May (see p. 10). In captivity the larvae had taken juniper as well as cypress. (2) Several examples of *Galerucella tenella* (L.) (Col., Chrysomelidae) which had been bred from larvae found feeding on *Spiraea ulmaria* (L.) Maxim. (Meadowsweet) on the Eashing, Surrey, field meeting, 4.vi.60.

Mr. M. G. MORRIS—(1) A female *Cimbex femorata* (L.) (Hym., Cimbicidae), the Birch Sawfly, taken at rest on a pavement in Maidstone, Kent, 3.vi.60. (2) Three male and three female *Mecinus janthinus* (Germ.) (Col., Curculionidae) swept from *Linaria vulgaris* Mill. (Toad-flax) in a private sand pit at Aylesford, Kent. A new Vice-County record.

Mr. T. R. EAGLES—(1) Juvenile and adult foliage of *Morus nigra* L. (Black Mulberry). A seedling in his garden, though five or six years old, was still producing nothing but deeply lobed leaves like those of the fig; the adult leaf is entire. He showed a fig leaf for comparison. The family Moraceae includes the genus *Ficus* as well as *Morus*. (2) Pellets found during the Princes Risborough, Bucks., field meeting, on 19.vi.60. Part of the hillside was strewn with these and there were many rooks' feathers near-by. The pellets were 2½-inches long and ¾-inch wide, and seemed to consist almost entirely of the remains of grass or a cereal. It was thought that rooks were in the habit of resting or roosting there. Kirkman, E. B. (1911, *The British Bird Book*, 1: 17) describes a raven roost and says: "The ground . . . was strewn with pellets or castings, for the raven, like his congeners and many other species, is in the habit of regurgitating the indigestible portion of his food".

Mr. F. D. BUCK—Three examples each of *Byturus ochraceus* (Scriba) and *B. urbanus* (Lindemann) Col., Byturidae) all, with the exception of one *B. urbanus* which came from Box Hill, Surrey, from Wood Walton Fen, Hunts. He gave details of the complicated synonymy which surrounds these species.

COMMUNICATIONS.

The Librarian reported that Mr. S. N. A. Jacobs had presented Fascicle 5 of Tome 1 of *Alexanor, Revue des Lépidoptéristes français*, and *Faunula Lepidopterologica Almeriense* by Ramon Agenjo. He also

reported the addition of the following two books to the library: *Dragonflies* by Philip S. Corbet, Cynthia Longfield and N. W. Moore, and *Hydrophilidae Europae* by Dr. Aldo Chiesa.

The larva of *Cacoecimorpha pronuba* Hübn. (Lep., Tortricidae) had been found by Mr. S. N. A. JACOBS in the autumn feeding in a Bramley Seedling. The apple rotted during the winter and became mouldy, but the larva continued to feed. Mr. Jacobs thought it remarkable that the frass remained quite dry under these unusual conditions. The larva spun up on 5th May and pupated in the middle of the same month; the imago emerged on 20th May.

Mrs. J. O. I. SPOCZYNSKA reported taking *Apamea ophiogramma* Esp. (Lep., Noctuidae) in Wicken Fen, Cambs., between 29th and 30th May 1960, and since her previous experience of this moth was in August, she asked if the species could be double brooded. Mr. B. GOATER said the season for this insect is rather long, but he could recall seeing this moth at no earlier date than 10th July.

14th JULY 1960.

The PRESIDENT in the Chair.

The death was announced of Mr. A. H. Lanfear.

EXHIBITS.

Mr. M. G. MORRIS—(1) Specimens of *Bagous frit* (Herbst) (Col., Curculionidae) from the New Forest Hants., 8.vii.60. This species was added to the British List by Dr. K. G. Blair (1935, *Ent. mon. Mag.* 71: 249) on specimens collected by Mr. P. G. Harwood from this locality and from Dorset. It has also been found in Norfolk, but the New Forest is the locality from which most of the specimens in collections come. *Bagous frit* is no unfamiliar name in lists of British Coleoptera, having been used for two other species, namely *B. subcarinatus* Gyll. and *B. collignensis* (Herbst). The very involved synonymy was cleared up by Blair in his 1935 paper, but for some reason Kloet and Hincks omit the true *B. frit* (Herbst) from their Check List, though it has more right there, than for instance, *B. arduus* Sharp or *B. rudis* Sharp. (2) Young larvae of *Eustrotia uncula* Clerk (Lep., Noctuidae) from ova laid by a female taken at Hothfield Bog, Kent, 26.vi.60.

Mr. T. R. EAGLES—*Choiromyces meandriformis* Vitt. (White Truffle) from Bayford, Herts., 19.vii.60.

COMMUNICATIONS.

The Secretary read to the meeting the message of greeting which the President was to carry to the Royal Society on the occasion of the Tercentary of its foundation. The text of the message was as follows:—

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

THE ROYAL SOCIETY OF LONDON
FOR IMPROVING NATURAL KNOWLEDGE.

Greetings.

The South London Entomological and Natural History Society, in sending Greetings to The Royal Society, offers its most sincere and hearty congratulations on the occasion of the tercentenary of the latter's foundation, and, both as one of the leading Entomological Societies of England and as a Society which has received much generous hospitality and aid from The Royal Society, welcomes this opportunity of recognising the unique and pre-eminent services already rendered by The Royal Society to the advancement of man's knowledge of the universe. It is this Society's privilege to express its heartfelt wish that The Royal Society may long continue to carry on its work in the service of mankind.

(signed) ROBIN M. MERE,
President.

(signed) BARRY GOATER,
Secretary.

Pepys House,
14, Rochester Row,
Westminster, S.W.1
July 1960.

Mr. C. N. HAWKINS said that *Celastrina argiolus* L. (Lep., Lycaenidae) was plentiful and he also read a cutting from a local newspaper in which concern was expressed about the draining of the Black Pond on Esher Common, Surrey. The concern was primarily with regard to the probable disappearance of *Rana esculenta* L., the edible frog, which had occurred in the pond.

At the Folkestone Warren, Kent, 29.vi.60, the PRESIDENT in company with Mr. E. C. Pelham Clinton had taken a fairly good example of *Itame brunneata* Thunb. (Lep., Geometridae) at mercury vapour light. He had since learned that at about the same time others had occurred in Hants and in Surrey. His specimen appeared to be different from the Scottish form, being a little larger and brighter. It was his opinion that it was a migrant from the Continent, for on the same evening *Lithosia quadra* L. (Lep., Arctiidae) had also come to the light. *Lithosia quadra* L. was also reported from Kent by another member.

Actinotia polyodon Clerck (Lep., Noctuidae) was reported to have been taken at Bradwell in Essex.

Mr. H. E. Goro, F.R.E.S., read a paper on Collembola illustrated by the lantern, which was followed by many questions covering feeding habits both in nature and in the laboratory, their value as genetic material, parthenogenesis, swarming, and the discolouration of snow by their presence.

28th JULY 1960.

Dr. A. M. MASSEE, Vice-President, in the Chair.

The following new members were declared elected: Messrs. B. A. Adams, E. N. Archer, R. M. Bicknell, B. N. Doutil, J. Garsfield, A. C. Griffith and D. A. Wills.

EXHIBITS.

Dr. A. M. MASSEE—(1) A series of *Dorytomus affinis* (Payk.) (Col., Curculionidae) taken during the field meeting at Ham Street, Kent, 12.vi.60; and although usually associated with willow it was, on this occasion, taken on oak. (2) A series of *Hallodapus montandoni* (Reuter) (Hem., Miridae) taken in Great Culand Chalk Pit at Eccles, Kent, 16.vii.60. This species, which is very rare, is predacious on *Myrmica scabrinodis* Nylander (Hym., Formicidae) and has been recorded from only three English counties; Kent, Gloucestershire and Somerset. This locality for *H. montandoni* was discovered by Mr. Side last year. Examples of both insects were presented to the Society for incorporation in its collections.

Dr. B. J. MACNULTY—A white form of *Centaurea scabiosa* L. (Greater Knapweed) from Tuddenham, Suffolk, with for comparison, the normal purple form. Step, E. (N.D. *Trees and Flowers of the Countryside*), Benthall, G. (1865, *Handbook of the British Flora*) and Clapham, A. R., Tutin, T. G., and Warburg, E. F. (1952, *Flora of the British Isles*) do not mention this white form.

Mr. F. D. BUCK on behalf of Mr. A. E. GARDNER—A living example of *Trichius fasciatus* (L.) (Col., Scarabaeidae) from Aviemore Inv., 24.vii.60.

Mr. A. S. WHEELER—Ova of *Apatura iris* (Lep., Nymphalidae) laid on 27th July by a female taken on the field meeting at Alice Holt Forest, Hants., 17.vii.60.

Mr. J. A. C. GREENWOOD—A teratological example of *Smerinthus ocellata* L. (Lep., Sphingidae) taken at mercury vapour light at Woking, Surrey, 22.vi.60. The moth had a double stranded thread twice the length of its body springing from the right side of the thorax.

COMMUNICATIONS.

The President reported by letter on his presentation of the Society's greetings to the Royal Society at the function celebrating the tercentenary of the Royal Society's foundation.

Colias croceus Fourc. (Lep., Pieridae) was reported by Dr. A. M. MASSEE to have been seen whilst he was collecting in Great Culand Chalk Pit, 16.vii.60, a female during the morning and a male during the afternoon. He also reported that at Wicken Fen, Cambs., on 9th July, he had noticed *Celastrina argiolus* L. (Lep., Lycaenidae) in unusually large numbers. *Papilio machaon* L. (Lep., Papilionidae), he continued, appears to have re-established itself, but surprisingly, more butterflies appeared to occur in the village gardens than in the fen. It was suggested by another member that this could be due to a shortage of

foodplant in the fen, resulting in the insects visiting the village gardens for carrot on which to lay their eggs. A discussion on the Swallowtail butterfly followed which included remarks on its habits abroad.

Mr. F. D. BUCK suggested that the *Smerinthus ocellata* L. exhibited by Mr. Greenwood had been attacked by a fungus and was not an example of teratology.

Apatura iris L. (Lep., Nymphalidae) was reported from Chiddingfold Woods, Surrey, on 10th July and again on 16th.

It was thought by Mr. C. N. HAWKINS that *Mormo maura* L. (Lep., Noctuidae) was becoming much scarcer in the Wimbledon area of Surrey. He had recently seen a specimen, but it was the first for several years; at one time it had been comparatively common in the district. Dr. A. M. MASSEE said the same trend had occurred at East Malling, Kent, where the moth was once a regular visitor to the light trap, but now no longer came.

During a discussion on conservancy techniques, Mr. F. T. VALLINS commented on possible dangers of scrub clearing if not done with the utmost care and forethought. He cited an instance of clearing to encourage one species which had destroyed the only known locality for another.

11th AUGUST 1960.

The PRESIDENT in the Chair.

A welcome was extended to a member from New York, Dr. Alexander Klots, and his wife; also welcomed to the meeting was Mr. Gothburg, a visitor from Sweden.

EXHIBITS.

Dr. C. G. M. DE WORMS—Two larvae of *Cucullia lychnitis* Ramb. (Lep., Noctuidae) from Salisbury, Wilts.

Mr. S. N. A. JACOBS—A short series of *Zygaena exulans* Hochen. (Lep., Zygaenidae) from Nordseter, Norway, which suddenly emerged in thousands after a single fine day during a week of wet weather, on the high rocky moorland of the district. Arising from a suggestion that the main food-plant of the species in this country is vetch, Mr. Jacobs said there was no appreciable amount of trefoil in the area.

Sir ERIC ANSORGE—An example of *Itame brunneata* Thunb. (Lep., Geometridae) taken in a mercury vapour light trap at Chalfont St. Peter, Bucks., 27.vi.60. In all, some six examples have been taken in the south of England this year and are assumed to be migrants, the exhibited specimen being lighter and larger than the Scottish form.

Mr. A. A. MYERS—A mosaic *Agrotis puta* Hübn. (Lep., Noctuidae) exhibiting homoeosis, taken at Kingsbury, N.W. London, 10.v.60. The left antenna of the moth appears to have developed into a leg and the tarsal segments of the left anterior leg are flattened.

Mr. A. E. GARDNER—(1) A series of *Chrysolina menthastri* Suff. (Col., Chrysomelidae) taken on the margins of Obelisk Pond, Windsor

Great Park, Surrey, 3.vii.60. (2) A series of *Bembidion litorale* (Ol.) (Col., Carabidae) from the Rothiemurchus Forest, Inv., 29.vii.60. (3) *Helobium multipunctatum* (L.) (Col., Carabidae) from the margins of Water-lily Loch, Rothiemurchus Forest, 29.vii.60.

Mr. T. R. EAGLES—Leaves of *Prunus spinosa* L. (Sloe) from Lee, N. Devon, 30.vii.60, with the brick-red spots caused by the fungus *Polystigma rubrum* (Pers.) D.C., known as Plum-leaf blotch.

THE PRESIDENT—An example of *Prionus coriarius* (L.) (Col., Prionidae) which occurred in his mercury vapour light trap at Chiddingfold, Surrey, 23.vii.60.

COMMUNICATIONS.

Mr. T. R. EAGLES said the white form of *Centaurea scabiosa* L. (Greater Knapweed) shown by Dr. MacNulty at the previous meeting occurs at Broadstairs, Kent, where sometimes can be found a half-and-half form.

Mr. D. LESTON said that some two or three years ago Mr. R. W. J. Uffen had collected for him a quantity of moss growing in association with *Caltha palustris* L. (Marsh Marigold) in a sunny position at Godalming, Surrey. This had been dried under a lamp, carefully sifted, and from it was taken *Pachycoleus rufescens* Sahl. (Hem., Cryptostemmidae). On the Cosford Mill field meeting at Thursley, Surrey, 15.v.60, (see p. 78), he searched out *Caltha palustris* L. in a sunny situation and collected the moss around it. Applying the same technique, he again obtained the species. He suggested the bug could be obtained in these circumstances only; the same technique having failed to turn up the insect from shady positions. Dr. A. M. MASSEE, who had collected the species in the better-known New Forest, Hants, localities, said his experience was quite different from that of Mr. Leston. His technique was to gather sphagnum from the middle of a bog, wring the water from it and sift onto a sheet. In this way he had obtained both the brachypterous and macropterous forms. He was unaware of any association with *Caltha palustris* L. Immature stages taken in the New Forest he had fed on Rose Thrips, so the bug was, at least partially, carnivorous.

Field meeting reports were given for Boxley Downs and Mickleham.

Mr. C. W. MACKWORTH-PRAED, F.R.E.S. read a paper 'A Naturalist in Spain' illustrated by colour transparencies and followed by many questions.

25th AUGUST 1960.

The PRESIDENT in the Chair.

The death was announced of Mr. C. C. Phelps, M.B.E.

The following new members were declared elected: Miss C. C. Yardley and Mr. G. A. Mitchell.

EXHIBITS.

Mr. F. D. BUCK—An example of *Ocypus fuscatus* (Grav.) (Col., Staphylinidae) taken in vegetable litter in Wood Walton Fen, Hunts., 14.viii.60.

Mr. A. H. SPERRING—A series of moths belonging to the genus *Zygaena* (Lep., Zygaenidae) which he could not satisfactorily determine as either *Z. lonicerae* von Scheven or *Z. trifolii* Esp.

Mr. A. E. GARDNER—The following species of Coleoptera: (1) *Arhopalus rusticus* (L.) (Cerambycidae) taken in a mercury vapour light trap, Aviemore, Inv., 5.viii.60. (2) Living examples of *Rhagium inquisitor* (L.) (Cerambycidae) bred from larvae found under pine bark in Black Wood, Rannoch, Perthshire, 26.vii.60. (3) A series of *Hyppophloeus bicolor* (Ol.) (Tenebrionidae) taken under the bark of a dead elm, Egham, Surrey, 18.viii.60.

Dr. B. J. MACNULTY—A series of *Chrysolina graminis* (L.) (Col., Chrysomelidae) from Wood Walton Fen, Hunts., 21.viii.60. One occurred on nettle, three on reed and three more on *Stachys palustris* L.; there was no mint in the area.

Mr. S. WAKELY—(1) A specimen of *Caloptilia pyrenaecella* Chrét. (Lep., Gracillariidae) which was bred from some maple leaves sent by Mr. A. Lobb, from the Isle of Wight. The only previous record of this species being of several examples bred by Mr. L. T. Ford in 1933 also from the Isle of Wight. (2) Specimens of *Teichobia verhuellella* Staint. (Lep., Lampronidae) bred from larvae found in leaves of *Phyllitis scolopendrium* (L.) Newm. (Harts tongue Fern). These were found by Dr. E. Scott in a garden at Ashford, Kent. (3) Specimens of *Teichobia filicivora* Meyr. from Bournemouth, Hants, where it occurs in Mr. S. C. S. Brown's garden in leaves of *Dryopteris filix-mas* agg. (Male Fern). The only other previous recorded locality is Dublin, Ireland, but this year Dr. Scott has found the larvae locally common on Male Fern at Ashford, Kent.

COMMUNICATIONS.

The TREASURER announced that Mr. E. Hare had donated £100 to the Housing Fund in memory of Edward Step. The fund now stood at £230.

It was announced that Mr. J. D. Bradley had presented to the Society a coloured transparency of the beetle *Trichius fasciatus* (L.) (Scarabaeidae) which had been exhibited at a recent meeting.

Reports of field meetings at Bookham and Horsley were given by Mr. T. R. Eagles.

Commenting on Mr. Wakely's exhibit, Mr. S. N. A. JACOBS said that when the sori containing the spores are not ripe the larvae of *Teichobia filicivora* Meyr. will mine the leaves of the fern.

Mr. F. D. BUCK gave details of a new and economic method of reproducing out-of-print books, in single copies if necessary, using microfilm and xerography.

The previous Saturday morning (20th August) the PRESIDENT had found a single *Herse convolvuli* L. (Lep., Sphingidae) in his mercury vapour light trap at Chiddingfold, Surrey, though there had been little else of interest in it recently.

Mr. C. N. HAWKINS commented on the strange occurrence of two examples of *Catocala nupta* L. (Lep., Noctuidae) resting on the same brick in Wimbledon, Surrey, at three weeks interval. However, Mr. WAKELY mentioned an instance of a specimen being disturbed from a tree trunk at Tiptree, near Colchester, Essex, and returning to the same spot. On being disturbed again it once more returned to the same spot, and again a third time. The President said this insect was reasonably common in Central London where he had seen it in the environs of the Victoria Embankment, and knew of its occurrence in Hyde Park. Mr. J. O. T. HOWARD reported it from Kensington Gardens and from Putney Bridge.

Arising from a query by Mr. A. H. SPERRING on a species in a check list of Lepidoptera, a discussion took place on the compilation and composition of check lists generally.

Mr. Sperring also asked if *Eupithecia millefoliata* Rössler (Lep., Geometridae) had been noticed this year, he having failed to find it in one of the recognised localities. The President said he had received larvae from the Chichester, Sussex locality but all were stung.

8th SEPTEMBER 1960.

The PRESIDENT in the Chair.

EXHIBITS.

Mr. S. WAKELY—(1) *Dasypoda hirtipes* F. (Hym., Apidae) from Wimborne Dorset. (2) *Pseudepipona herrichii* Saussure (Hym., Vespidae) from Arne, near Wareham, Dorset. (3) Two examples of *Sehirus dubius* Scop. (Hem., Cydnidae) taken on their foodplant *Thesium humifusum* D.C. (Bastard Toadflax) at Badbury Rings, Dorset. All taken in mid-July. (4) *Strangalia quadrifasciata* L. (Col., Cerambycidae) taken on the Ockham, Surrey, field meeting, 23.vii.60.

Mr. M. G. MORRIS—The British species of *Rhinoncus* Schon. The species in this genus may be very briefly characterised as ceuthorhynchine weevils with a short broad rostrum and a seven-segmented funiculus. They are associated with Polygonaceae. *R. pericarpus* (L.) from East Malling, Kent; the commonest species, widespread on various docks (*Rumex* spp.). In spite of Fowler's recorder the exhibitor has not found it on *Polygonum*. *R. inconspicuous* (Herbst.), from Aylesford, Kent, and Frensham, Surrey, found less commonly than the preceding species, possibly because of its more obscure habits. It is often common at the roots of the foodplant and is sometimes swept in abundance in the evening, but only occasional examples are obtained by sweeping during the daytime. It is almost exclusively associated with

Polygonum amphibium L. *R. castor* (F.), from Fleet, near Aldershot, Hants. Said to be common but the exhibitor has only met it once. It is associated with sheep's sorrel (*Rumex* (*Acetosella*) *acetosella* agg.) and found on a bare sandy soil. *R. bruchoides* (Herbst), from Nether Hayford, Northants. and swept from *Persicaria* (*Polygonum persicaria* L.) and it is possibly the species least often met with. It appears to be associated with *Polygonum* spp. *R. perpendicularis* (Reich.), from Aylesford, Kent, and Frensham, Surrey. A common species often found in company with *R. inconspicuum* (Herbst), but more easily and commonly swept. It appears to have a much wider host range than that species and is found on spp. of *Polygonum* other than *amphibium* L. The exhibitor has also found it on dock (*Rumex* spp.). *R. denticollis* Gyll., which appears in the genus in Fowler is now known as *Phytobius quadrinodosus* (Gyll.).

MR. A. E. GARDNER—*Zabrus tenebrioides* (Goeze), (Col., Carabidae), a series taken at the foot of the Black Rock cliffs, Brighton, Sussex, 4.ix.60.

MR. J. B. TATUM—Colour photographs by J. P. Grabet from *She* showing the emergence of the butterfly *Charaxes jasius* L. (Nymphalidae).

COMMUNICATIONS.

Reports of the field meetings at Higham, Kent, and Newlands Corner, Surrey, were read by Mr. S. Wakely and Mr. T. R. Eagles.

22nd SEPTEMBER 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs. J. G. M. Gouillard and Colin Johnson.

EXHIBITS.

MR. S. N. A. JACOBS—Referred to the question, raised at the previous meeting, of the correct generic name for *filicivora* Meyr. (Lep., Lamproiniidae), exhibited by Mr. S. Wakely on 25.viii.60 (see p. 19) as *Teichobia filicivora* Meyr. He showed the original description of *Mnesipatris filicivora* Meyr. (1937, *Entomologist*, 70: 194) and also an illustration of the congener, *M. phaedrospora* Meyr. (1957, *Icones Heterocerorum Japonicorum in coloribus Naturalibus* Pl. 1) mentioned by Meyrick in his description of *M. filicivora**.

*The question of the correct generic placing of *filicivora* Meyr. has been raised with Mr. J. D. Bradley of the British Museum (Nat. Hist.) who expresses the following opinion: "I have looked into the *Mnesipatris* question and it seems to me that the species *filicivora* Meyrick belongs more properly in the genus *Teichobia* H.-S. with *verhuelletella* Staint. Pierce & Metcalfe (1935, *Brit. Tin.*) put *filicivora* and *verhuelletella* in *Teichobia*; and Petersen (1958, *Beitr. zur. Ent.* 8: 415) does too; and I agree with them. The genus *Mnesipatris* Meyrick was erected for a Japanese species, *phaedrospora* Meyrick which according to Petersen is an incurvariid, not a tineid as is *filicivora*—so it cannot be used for the latter species in any circumstances".—Editor.

Dr. A. M. MASSEE—A series of *Ceuthorhynchus viduatus* (Gyll.) (Col., Curculionidae) which occurred in numbers at Wood Walton Fen, Hunts., 17.viii.60, on the "Copper" field (a reclaimed portion of the Fen) on *Lythrum salicaria* L. (Purple Loosestrife). This hostplant is unusual since the weevil is usually associated with *Stachys sylvatica* L. (Hedge Woundwort) and *S. palustris* L. (Marsh Woundwort). This insect is widespread in England, but very local. It occurs also in Scotland.

Mr. S. WAKELY—The following species of Lepidoptera taken in Suffolk during the first fortnight of August this year: *Schoenobius gigantellus* Schiff. and *Evergestis extimalis* Scop. (Pyralidae), *Anerastia lotella* Hübn., *Phycita boisduvaliella* Guen. and *Nyctegretis achatinella* Hübn. (Crambidae), *Eucosma maritima* Westw. (Tortricidae), all from Southwold, and *Platytes alpinellus* Hübn. (Crambidae) and *Oxyptilus distans* Zell. (Pterophoridae) from Thorpness.

Mr. R. W. J. UFFEN—(1) The leaf-mining larva of *Lyonetia clerckella* L. (Lep., Lyonetidae) on birch, from Silwood Park, Berks., together with pupating larvae in their cocoons. (2) Living examples of the dipteran *Paroxyna misella* (Loew H.) (Trypetidae).

Mr. A. E. GARDNER—The following local species of Coleoptera: *Endomychus coccineus* (L.) (Endomychidae) from Banstead, Surrey, 10.ix.60; *Necrodes littoralis* (L.) (Silphidae) in mercury vapour light trap, Aviemore, Inv., 4.viii.60; and *Pytho depressus* (L.) (Pythidae) bred from larva found under Scots Pine bark, Aviemore. 28.vii.60.

Mr. T. R. EAGLES—(1) A frond of *Thelypteris oreopteris* (Eheh.) C. Chr. (Mountain Fern) from Tilgate Forest, Sussex, 18.ix.60. (2) Larvae of *Pelurga comitata* L. (Lep., Geometridae) from Enfield, Middlesex.

COMMUNICATIONS.

Both Mr. A. E. GARDNER and Mr. F. D. BUCK also reported *Ceuthorhynchus viduatus* (Gyll.) from Wood Walton Fen, having taken a single example each (14 and 28.viii.60) in vegetable refuse in the same area as Dr. Massee. They had assiduously swept the *Stachys palustris* L. in the area without obtaining the beetle and had swept *Lythrum salicaria* L. in that spot for several years without finding it.

Reporting on a visit to the Scottish Highlands from which he had only just returned, Dr. C. G. M. DE WORMS said Lepidoptera were plentiful both at light and during the daytime. *Xylena vetusta* Hübn. (Noctuidae) and *Trichiura crataegi* L. (Lasiocampidae) were reported, and *Coenocalpe lapidata* Hübn. (Geometridae) was found to be plentiful, the females being on the wing at 3 p.m. B.S.T. Referring to migrants he said an example of *Acherontia atropos* L. (Sphingidae) had appeared at light on two consecutive nights and that *Spaelotis ravida* Schiff. had also appeared. In the Edinburgh district of the Lowlands Dr. de Worms said *Pieris brassicae* L., *P. rapae* L. and *P. napi* L. (Pieridae) were common and in fresh condition. *Cirrhia gilvago* Schiff. (Noctuidae) was also reported.

Dr. H. B. D. KETTLEWELL expressed surprise at Dr. de Worms's reference to *Spaelotis ravida* Schiff. as a migrant. He agreed it was, but said most authorities on migration were of the opposite opinion.

On the subject of migration Mr. S. N. A. Jacobs said *Plusia gamma* L. (Noctuidae) were fairly common in the City of London; he had noticed some 15 examples recently, mostly sitting on walls.

Referring to Mr. Uffen's exhibit, Dr. A. M. MASSEE said *Lyonetia clerckella* L. is a major pest in apple orchards this year on the Continent. He recalled that this was so in Kent in 1920, but to his knowledge the insect had caused no great damage since. The larva of *Endomychus coccineus* (L.) exhibited by Mr. Gardner fed, he said, on *Stereum purpureum* Pers. (Silver leaf Fungus) and occurred commonly in derelict orchards in Kent. Other members reported the larvae from fungus on birch and beech.

Plusia gamma L. was reported in the Wimbledon area as was *Polygonia c-album* L. and *Vanessa atalanta* L. (Lep., Nymphalidae).

Dr. Kettlewell said a series of eight mercury vapour light traps had been running in the Shetland Islands, which showed migration to have been poor this year in these islands. He went on to say that *Pieris brassicae* L. (Lep., Pieridae) was now well established in the Shetlands and was doing excessive damage to the cabbage crop.

The PRESIDENT said he had obtained four *Herse convolvuli* L. (Lep., Spingidae) in his mercury vapour light trap at Chiddingfold, Surrey, this year, and two *Nycterosia obstipata* F. (Lep., Geometridae).

Mr. R. W. J. Uffen read a paper on "Alternating larval biology in Trypetidae (Dipt.)" which he illustrated by slides. A cinematograph film, "Journey into Spring", was also shown.

13th OCTOBER 1960.

The PRESIDENT in the Chair.

EXHIBITS.

Dr. A. M. MASSEE—Two examples of *Notaris bimaculatus* (F.) (Col., Curculionidae), one in refuse and the other on a willow, taken near East Malling in September last.

Mr. A. E. GARDNER—The following species of Odonata: (1) *Sympetrum nigrescens* Lucas (Libellulidae), a series taken from a loch in the Craigellachie National Nature Reserve, Aviemore, 29.vii.60. This represents a new locality for the species in Inverness-shire. (2) *Coenagrion hastulatum* (Charp.) (Coenagriidae), a female taken near Pitlochry, Perthshire, 26.vii.60. Although known from this locality for some time, published records do not appear to include Perthshire for this species.

Mr. M. G. MORRIS—Some weevils (Col., Curculionidae) associated with birch, collected at East Malling, Kent, 1 and 5.ix.60; *Apion simile* Kirby, *Strophosomus subrotundus* (Marsh.) *Curculio betulae*

(Steph.), *C. rubidus* (Gyll.), *Coeliodes rubicundus* (Herbst), *Rhynchaenus rusci* (Herbst) and *R. stigma* (Germ.). Most of the weevils which can be found in May and June can also be obtained in the Autumn. There may be some exceptions to this rule; the attelabids appear to be absent and so do *Phyllobius* and *Polydrusus*. Most of the species exhibited are common. The most notable are *Apion simile* Kirby (very common this year, but usually only occurring in ones and twos). *Curculio betulae* (Steph.) and *C. rubidus* (Gyll.),

Mr. S. R. BOWDEN—Pupae of *Pieris napi* L. (Lep., Pieridae) formed without wings, from two or three related broods, inbred from previous broods.

THE PRESIDENT—a cutting from *The Times* recording *Plathypena scabra* F., (Lep., Noctuidae), a common moth in N. America hitherto unrecorded in the British Isles. It is most likely to be confused with *Hypena rostralis* L. (Noctuidae).

COMMUNICATIONS.

Mr. J. O. T. HOWARD said the fungus *Phallus impudicus* (L.) Pers. (Stinkhorn) was becoming a nuisance in his garden; he asked how it could be eradicated. It was the general opinion of members who knew this species that it was difficult to remove permanently.

Mr. R. W. J. UFFEN said that the young larvae of *Coleophora alnifoliae* Barasch (Lep., Coleophoridae), which he had added to the British List from fully fed larvae found on field meetings last spring, made two small cases before hibernating. The young larvae of related species are not well-known, but probably make only one case before their final full-sized case.

Field meeting reports were given as follows: Ashted, Mr. M. G. Morris; Druids Grove, Mr. T. R. Eagles; and Oxshott, Mr. Eagles for Dr. J. Ramsbottom.

Dr. S. H. SKAIFE read a paper "Ants as laboratory subjects" which he illustrated with coloured transparencies. The paper was followed by questions and discussion covering the size of populations and their limitation according to food supply, radiation tests and effects, parthenogenesis, cytology, the association of smell and food, and swarming.

31st OCTOBER 1960.

THE ANNUAL EXHIBITION—RECORD OF EXHIBITS

Mr. A. E. ASTON—(1) *Spilosoma lubricipeda* L., aberration with spots united on forewing, Northfield Wood, Onehouse, Suffolk, 21.vi.51; *Hamearis lucina* L., Newlands Corner, Surrey, 22.v.60; *Galleria mellonella* L., four females and one male, at light, Stowmarket, Suffolk, August 1959 and August 1960; *Parculype* (*Coenotephria*) *berberata* Schiff., series beaten in drizzle from barberry and maple in lane near Bury St. Edmunds, Suffolk, 11.viii.60;

Coenonympha pamphilus L., underside aberration with dark bar across forewing, Featherbed Lane, Addington, Surrey, 4.viii.60; *Menophra* (*Hemerophila*) *abruptaria* Thunb., variation in Dulwich area, S. E. London, from sooty through mahogany to dusky and normal, 1958-60; *Alcis* (*Cleora*) *repandata* L., dusky aberration at light, Dulwich, 25.vi.60; *Polygonia c-album* L., with the C-mark almost completely circular, Bury St Edmunds, 10.viii.60; *Arctia caja* L., asymmetrical aberration with left forewing plain brown and right forewing usual reticulated pattern, hindwings slightly crippled, at light, Bury St. Edmunds, midnight 7.viii.60; *Xanthorhoe fluctuata* L. ab. *costovata* Haw., at light, Dulwich, 5.vi.60; *Lampropteryx suffumata* Schiff., Newlands Corner, 22.v.60; *Ectropis consonaria* Hübn., Netley, Surrey, 22.v.60; *Pseudoboarmia punctinalis* Scop., at rest, Eashing, Surrey, 4.vi.60; *Amathes c-nigrum* L., three examples of an aberration in which the pale costal mark is restricted to orbicular stigma and is round, Stowmarket, and Hepworth, Suffolk, August 1960; *Arenostola fluza* Hübn., at light, West Stow, Suffolk, 19.viii.60; *Gonodontis bidentata* Clerck, melanic series from sooty grey to pale with dark borders, Dulwich; five zygaenids of unknown identity from Dearleap Wood, 26.v.60 and White Down, Surrey, 22.v.60; *Euchoeca nebulata* Scop., a series from Eashing, Surrey, 4.vi.60; *Orthonama lignata* Hübn., a series at light, Barton Turf, Norfolk, 15.viii.59. (2) Microlepidoptera: 38 unidentified specimens from Dulwich and Surrey, May to July 1960; and 37 unidentified specimens from Suffolk, August 1960.

Dr. N. L. BIRKETT—(1) British Lepidoptera: *Fabriciana* (*Argynnis*) *cydippe* L. ab. *suffusa* Tutt, taken in Kendal district, Westmor., in 1917; *Erebia aethiops* Esp., from Arncliffe, Westmor.; *Apatele alni* L. from Kendal district, in general approaching ab. *suffusa* Tutt; *Arenostola phragmitidis* Hübn. from Silverdale area, Westmor.; *Gonodontis bidentata* Clerck ab. *nigra* Prout, the first of this aberration taken in Westmorland; *Parasemia plantaginis* L. ab. *hospita* Schiff., a series bred some years ago by Mr. T. Smith of Kendal and given to the exhibitor recently; *Eustroma reticulata* Schiff., from Windermere, Westmor.; *Eurhodope* (*Euzophora*) *advenella* Zinck., taken in a light trap at Kendal and the first record for the area; *Evergestis pallidata* Hufn. (*straminalis* Hübn.) taken at light at Sand-scale Warren, and the second Lancashire record; *Acleris* (*Peronea*) *hastiana* L., a series bred from larvae taken at Walney Island, Lanes.; *Epinotia* (*Eucosma*) *nisella* Clerck, taken at light near Silverdale; *Mompha fulvescens* Haw., bred from larvae taken at Kendal; *Paltodora cystisella* Curt., two specimens taken in Roudsea Wood, a new Lancashire record. (2) Foreign Lepidoptera: *Melitaea didyma* Oberth. ab. *meridionalis* Staud., taken at Vernet les Bains, Pyr.-Or.; *Lysandra bellargus* Rott. ab. *polonus* Zett., from Monte Bisbino near Como, Italy; *Colias nastes* Boisd. s.s.p. *werdandi* Zett, a single example brought to the exhibitor by friends after a visit to Abisko, Sweden; *Spirothyrus althaea* Hübn., from Vernet les Bains; *Erebia neoridas* Boisd., from

Vernet les Bains. (3) Some Diptera with aquatic larvae: *Liancalus virens* (Scop.) (Dolichopodidae), a short series from Grasmere, Westmor., taken on the side of a house by a stream; *Procladius sagittalis* (Kieff.), *Protanypus morio* (Zett.), *Brillia modesta* (Meig.), *Hydrobaenus* (Smittia) *aterrimus* (Meig.), *Chironomus anthracinus* Zett., *C. dorsalis* Meig. and *C. (Microtendipes) pedellus* (Deg.) (Chironomidae).

Mr. C. S. H. BLATHWAYT—*Apatele rumicis* L., a few melanic and intermediate forms taken at light at Weston-super-Mare, Somerset; *Agrotis exclamationis* L., two aberrations taken this year; *Plusia gamma* L., an aberration taken at Weston-super-Mare this year, with the gamma-mark unusually formed; *Xanthorhoë montanata* Schiff., two forms with the dark band on the forewings much reduced; *Colotois pennaria* L., a banded specimen taken at light at Weston-super-Mare; *Biston striataria* Hufn., some melanic and intermediate forms taken at Weston-super-Mare; *Biston betularia* L., some intermediate forms taken at Weston-super-Mare including an example with aberrant forewings and typical hindwings.

Mrs. S. R. BOWDEN—Colour transparencies, mostly of British flowering plants.

Mr. R. F. BRETHERTON—(1) Selected butterflies taken in Italy and Switzerland during 1960. In all some 56 different species or subspecies were shown, including a female aberration of *Pyrgus malvoides* El. & Ed. with white markings blurred, from the Pallanza district of Italy near Lake Maggiore, at 2,000 metres, taken 3-15.vii.60. (2) Some aberrations of British moths captured in 1960: *Drepana falcataria* L., a male with all wings suffused with smoky brown, the ordinary markings being almost obscured, Ottershaw, Surrey, at light, 9.v.60; *Asphalia diluta* Schiff., a male with forewings almost unicolorous chocolate-brown, with single central band broad and slightly darker, Duford, Surrey, at light, 27.ix.60; *Drymonia dodonaea* Schiff. (*trimacula* Esp.), a male with basal area of forewings and the thorax sooty black, Ottershaw, at light, 22.v.60 (Plate I, fig. 8); *Apatele alni* L., a male with very pale markings on forewings unusually white and extensive, Alresford, Hants, at light 4.vi.60; *Cucullia chamomillae* Schiff., a male with all wings pale greyish-white, Ottershaw, at light, 4.v.60; *Polia nebulosa* Hufn., female resembling ab. *robsoni* Collins, Ottershaw, at light, 28.vi.60. (3) Selected British moths captured or bred luring 1960; From Ottershaw, Surrey: *Spaelotis ravidata* Schiff., a male at light, 31st August; *Cossus cossus* L., 18th June. From Southwold district, Suffolk, 30th July to 1st August: *Arenostola elymi* Treits., *A. brevilinea* Fenn, *Nonagria neurica* Hübn., *Eremobia ochroleuca* Schiff., *Hadena suasa* Schiff., *Simyra venosa* Borkh., *Malacosoma castrensis* L., *Cucullia asteris* Schiff., *Sterrhia ochrata* Scop., *Anerastia lotella* Hübn., *Homoeosoma cretaceella* Rössler (bred from tansy blossom), *Schoenobius gigantellus* Schiff., *Platytes cerussellus* Schiff. From Bury St. Edmunds, Suffolk: *Heliothis virescens* Hufn. From Alresford, Hants: *Craniophora ligustri* Schiff., *Alispa angustella* Hübn. taken and bred, *Euphyia cuculata* Hufn. From Brook, Kent:

Pachetra sagittigera Hufn., *Idaea lineata* Scop. From Portland, Dorset: *Leucania l-album* L., *Palpita unionalis* Hübn. (two examples at flowers, 2nd October), *Nephopteryx* (*Phycita*) *semirubella* Scop., Gen. II. From Wittering, Sussex: *Agriphila* (*Crambus*) *selasellus* Hübn. From Surrey: *Eupithecia irriguata* Hübn., *E. pimpinellata* Hübn., *Trichiura crataegi* L., *Hepialus fusconebulosus* Deg. From Dawlish, Devon: *Euplagia quadripunctaria* Poda (*hera* L.), bred ab. ovo.

Mr. F. D. BUCK—Living and set examples of the following aquatic Coleoptera: *Colymbetes fuscus* L., *Rantus notatus* F., *Agabus nebulosus* Fo., *A. bipustulatus* L., *Hydroporus* spp. and *Haliphus* spp. All taken at Benfleet, Essex 22.ix.60.

Mr. S. E. W. CARLIER—Lepidoptera from Aviemore, Inv., and the surrounding district taken between 4 and 11.vi.60. At sugar on posts of a deer fence: *Apatele leporina* L., *A. psi* L., *A. menyanthidis* View., *A. euphorbiae* Schiff. s.sp. *myricae* Guen., *Hyppa rectilinea* Esp., *Apamea crenata* Hufn., *A. remissa* Hübn. (*obscura* Haw.), *Eumichtis adusta* Esp., *Ceramica pisi* L., underside aberration of *Hadena thalassina* Hufn., *H. contigua* Schiff., *H. conspersa* Schiff., *Hada nana* Hufn. At rest on posts: *Tinea picarella* Clerck, *Scoparia truncicolella* Staint. (an August insect in the Birmingham woods area). At mercury vapour light: both normal and melanic examples of *Ortholitha plumbaria* F. (*umbrifera* Prout), also *Electrophaës corylata* Thunb., and ab. *albocrenata* Curt., *Opsibotys* (*Perinephela*) *fuscalis* Schiff., *Apotomis* (*Argyroplote*) *sororculana* Zett., *Laspeyresia confierana* Sax. and *Roeslerstammia erzlebelli* F. On moorland heaths near Loch Garten, Newtonmore, etc.: *Scoparia ambigualis* Treits., f. *atomalis* Doubl., *Ancyliis unguicella* L. including an albino, *Epinotia nemorivaga* Tengst., *Hedya atropunctana* Zett. (*Argyroplote dimidiana* Sodof.), *Olethreutes* (*Argyroplote*) *arbutella* L., *O. (A.) mygindana* Schiff., *Gelechia longicornis* Curt. Beaten from Juniper: *Borkhausenia subaquileia* Staint. and *B. similella* Hübn. Sitting on pine trunks: *Laspeyresia cognatana* Barr. (*pactolana* Zell.). Findhorn Valley: *Hydriomena coerulata* F., on alders at Coignafearn; *Xanthorhœ montanata* Schiff., including ab. *degenerata* Prout. and *Microstega* (*Perinephela*) *terrealis* Triets., at Dulcie Bridge, Nairn., which would seem to be the most northerly record for this species, Beirne, B. P. gives “. . . southern Scotland.” (1954, *British Pyralid and Plume Moths*, p. 150, London), Merrick E. gives “Devon, N. England to the Clyde . . .” (1927, *A Revised Handbook of British Lepidoptera*, p. 426, London), and Barrett, C. G. gives “In Scotland in Kirkcudbrightshire and Argyll, also in Fife . . .” (1904, *Lep. Brit. Is.*, 9: 198).—See also Mr. F. A. NOBLE.

Mr. L. CHRISTIE, see Mr. M. W. F. Tweedie.

Mr. H. E. CHIPPERFIELD—(1) A selection of moths taken or bred as a result of ten days in the Aviemore district of Inverness-shire at the beginning of June 1960: *Apatele psi* L., *A. menyanthidis* View., *A.*

euphorbiae F., *Hadena contigua* Schiff., *H. bombycina* Hufn., *H. thalassina* Hufn., *H. conspersa* Schiff., *Hada nana* Hufn., *Eumichtis adusta* Esp., *Hyppa rectilinea* Esp., *Anarta melanopa* Thunb., *Ortholitha mucronata* Scop. s.sp. *scotica* Cockayne, *Thera cognata* Thunb., *Electrophaus corylata* Thunb., *Hydriomena furcata* Thunb., *Eupithecia satyrata* Hübn., *E. sobrinata* Hübn., *Itame brunneata* Thunb. (*fulvaria* Vill.), *Selenia lunaria* Schiff., *Psolos coracina* Esp., *Olethreutes* (*Argyroploce*) *schulziana* F. (2) Some Suffolk captures: *Hadena compta* Schiff., Stowmarket, 14, 18 and 25.vi.60; *Procus latruncula* Schiff., Stowmarket, 13 and 18.vi.60; and at light at Aldeburgh, *Ellopiia fasciaria* L. 10.ix.60, *Blastobasis decolorella* Woll, 9.vii and 10.ix.60, *Apomyelois* (*Euzophora*) *neophanes* Durr. 9.vii.60, and *Crambus hamellus* Thunb., 10.ix.60. (3) *Depressaria heracliana* L., bred from pupa found in a stem of *Heracleum sphondylium* L., (Cow Parsnip). Nineteen other pupae from the same stem were all parasitized and produced ten *Barichneumon heracleanae* Bridgeman (Hym., Ichneumonidae) and about 80 of a small chalcid wasp which Mr. J. F. Perkins of the British Museum (Nat. Hist.) thinks is probably *Litomastix hartmanni* Meyr. (4) Living larvae of *Thalpophila matura* Hufn.

Major A. E. COLLIER—(1) Aberrations of Rhopalocera captured or bred in Surrey during 1960; *Clossiana* (*Argynnis*) *selene* Schiff., melanic and rayed upperside with extreme rayed underside (Plate I, Figs. 4 and 5); *Maniola jurtina* L., female upperside and female underside, each with two extra spots; *Coenonympha pamphilus* L., male with very dark underside, male ab. *antiparvipuncta* Leeds, female *antiexcessa* Leeds, male showing "postsinisunicolor"* characteristics; *Lysandra bellargus* Rott., a female showing the "sinisnubila" characteristics as given by Bright & Leeds (1938, *Monograph of the Chalk Hill Blue Butterfly*), a male showing the "postdexaeca" characteristics as given by Bright & Leeds (*loc. cit.*); *Aphantopus hyperantus* L. ab. *lanceolata* Shipp, four bred females, one with remarkable upperside hindwings, female ab. *arete* Müll + *lanceolata* Shipp; *Lycaena phlaeas* L., two bred males, one with the characters of ab. *discreta* Tutt of *Lysandra coridon* Poda, the other with both hindwings exhibiting homoeosis; *Lysandra*

*This name was not published as an aberration of *C. pamphilus* L. by Leeds (1950, Proc. S. Lond. ent. nat. Hist. Soc., 1948-49: 80-122) but is a combination suggested by him to cover several species and is consequently not a valid aberrational name.—Editor.

ANNUAL EXHIBITION, 29th October 1960.

1. *Arctia caja* L. aberration, Air Marshall Sir Robert Saundby.
2. *Pararge aegeria* L. aberration, Mr. A. S. Wheeler.
3. *Colias croceus* Fourc. aberration, Mr. R. Hayward.
4. Underside and 5. upperside of *Clossiana selene* Schiff. rayed aberration, Major A. E. Collier.
6. *Melanargia galathea* L. ab. *aperta* Rebel, Mr. B. K. West.
7. Upperside and 9. underside of *Lycaena phlaeas* L. aberration, Mr. D. L. Young.
8. *Drymonia dodonea* Schiff. aberration, Mr. R. F. Bretherton.
10. Aberration and 12. typical example of *Isturgia carbonaria* Clerck, Mr. S. W. P. Pooles.



coridon Poda, a male underside ab. *ultrafowleri* B. & L. (2) On behalf of CHRISTOPHER NIXON, *Heodes tityus* Poda, female caught near Seaford, Sussex, August 1958 (see Collier, A. E. 1960, *Ent. Rec.* **72**: 263); *Polyommatus icarus* Rott., male underside ab. *discreta* Tutt which also includes the same characteristics as the *Lysandra coridon* Poda ab. *alba* B. & L. + *fowleri* South, Dorset, August 1960.

Mr. S. COXEY—The following Lepidoptera: From Aviemore district, Inv.: *Apamea exulis* Lef., *Amathes agathina* Dup., *A. depuncta* L., *Enargia paleacea* Esp., *Carsia sororiata* Hübn., (*paludata* Thunb.), *Xanthorhoë munitata* Hübn., *Plusia interrogationis* L., *Eurois occulta* L., *Entephria flavicinctata* Hübn., *Anaitis efformata* Guen., *Gnophos obfuscata* Schiff. (*myrtillata* Thunb.) and *Crocallis elinguaris* L., Scottish forms. From S. Devon: *Mythimna turca* L., *Leucania putrescens* Hübn., *L. l-album* L., *Agrotis trux* Hübn and *Epirrhoë galiata* Schiff. From Wood Walton Fen, Hunts.: *Leucania pudorina* Schiff., *L. obsoleta* Hübn. and *Arenostola extrema* Hübn. From the Forest of Dean, Glos.: *Alcis repandata* L., *Abraxas sylvata* Scop., *Discoloxia blomeri* Curt., *Horisme tersata* Schiff. and *Melanthia procellata* Schiff.

Mr. Gordon F. DOLLIMORE—(1) Four specimens of *Hydrillula palustris* Hübn., taken at Wood Walton Fen, Hunts., June 1960; a series of bred *Dasychira fascelina* L., with for comparison captured examples from Ringwood, Hants, 1959-60; a series of bred *Orgyia recens* Hübn., (*gonostigma* F. auctt. nec Scop.); a series of bred hybrid, from a female *Selenia tetralunaria* Hufn. × male *S. bilunaria* Esp., Ringwood, 1960. (2) Some Lepidoptera taken on the Dorset coast this autumn, 1960: *Heliothis armigera* Hübn., *Lithophane leautieri* Boisd., *Leucania unipuncta* Haw., *Aporophyla australis* Boisd., *Dasypolia templi* Thunb. and *Palpita unionalis* Hübn.

Mr. R. C. DYSON—*Hyppa rectilinea* Esp., two bred specimens which emerged in September 1960, from eggs laid by a female collected at Aviemore, Inv., by A. J. Wightman. Five larvae pupated in August and September, producing the two moths exhibited, two deformed specimens and one further perfect example emerged on 19th October. The remainder of the brood, apart from losses, fed until the middle of October and are now resting. *Eumichtis lichenea* Hübn., specimens of the pale form bred from larvae collected at Freshwater, I.O.W., in April 1960. A normal form from Eastbourne, Sussex, was shown for comparison.

Mr. T. R. EAGLES—Some cryptogams collected recently, fungi, mosses, lichens, leafy liverworts and thallose liverworts.

Mr. R. FAIRCLOUGH—Short series of Lepidoptera bred from captured females: *Enargia paleacea* Esp., Wyre Forest, Salop; *Colobochyla salicalis* Schiff., Kent; *Acosmetia caliginosa* Hübn., Hants; *Lampropteryx otregiata* Metc. and *Epirrhoë tristata* L., Montg.; and *Apatete tridens* Schiff., Leigh, Surrey. Bred as second broods: *Minoa murinata* Scop., Hants; *Epirrhoë rivata* Hübn., Leigh, Surrey. Bred from Aviemore, Inv., female and assembled Wyre Forest male, *Endromis versicolora* L. Five *Harpyia biscuspis* Borkh., taken on one night at

Balcombe, Sussex. Four species taken in a mercury vapour trap in 1960: *Apamea scolopacina* Esp., *Celaena leucostigma* Hübn., *Aporophylla lunula* Stroem (*nigra* Haw.), and *Lithophane leautieri* Boisd. new to the Leigh, Surrey area; the last named being believed to be the first Surrey record. Two live second brood *Panaxia dominula* L., from a small number of larvae which continued to feed up.

Mr. IAN G. FARWELL—The following Lepidoptera: *Herse convolvuli* L., a perfect female which made a sudden appearance on a television screen near Lymington, Hants, September 1959; *Arctia caja* L., a female aberration almost completely void of cream markings on forewings, and with strongly banded hindwings, bred from a larva found in the garden at Lymington, July 1959; *Euphydryas aurinia* Rott., a male with very suffused wings, captured in Dorset, May 1958; *Melitaea cinxia* L., two series, one consisting of one male, two females with decreased black markings, two females with excess black on forewings, and one female underside, bred, I.O.W., 1960; the other, of six females with pale ground colour, two females undersides showing "obsoleta" characteristics, one male with decreased black markings, one female aberration with almost entirely black hindwings and suffused forewings, all bred, June 1960 from larvae found in a neighbour's garden at Lymington, from a few specimens which had escaped in June 1957, nearly all these larvae were feeding on *Vicia cracca* L. (Tufted Vetch); *Nymphalis antiopa* L., an extreme aberration with the yellow border broadly suffused towards the centre of all four wings, of European origin with, unfortunately, no further data.

Mr. R. L. E. FORD—A case showing the different geographical races of the butterfly *Hebomoia glaucippe* L. with a map of their distribution.

Mr. BRIAN E. FROST—Photographs of lepidopterous subjects all taken in the studio with the exception of *Aglais urticae* L. Unless otherwise stated, all specimens were captured or reared at Colchester, Essex. None of the insects photographed were controlled, i.e. anaesthetised, etc. Photographed on Ilford H.P.4 3½" × 2½" plates, using a lens of unknown vintage with a focal length of 6". Subjects shown were: Ova of *Smerinthus ocellata* L., on willow, magnification × 14; newly emerged *Nymphalis io* L., magnification × 2; *Thymelicus lineola* Ochs., resting on bracken, magnification × 4; freshly emerged *Deilephila elpenor* L., magnification × 2; a close-up of freshly emerged male *Sphinx ligustri* L., showing frenulum and retinaculum, this photograph shows the position of frenulum and retinaculum in relation to the rest of the insect, magnification × 12; frenulum and retinaculum of *Sphinx ligustri* L., magnification × 16 approx.; *Aglais urticae* L., Berechurch, Colchester, 1960; newly emerged *Celastrina argiolus* L., magnification × 4; pupa of *Leptidea sinapis* L., photographed on the larval foodplant, tuberous pea, ex Hog Wood, Sussex; freshly emerged *Leptidea sinapis* L., bred from ova obtained at Hog Wood, magnification × 3.

Mr. A. E. GARDNER—A collection of British Odonata comprising 45 species represented by 840 specimens. Adults and larvae of all the

British species were shown including the male *Sympetrum meridionale* (Selys) taken at Dawlish, Devon, and formerly in the Turner collection. Introductory notes on the Odonata were provided and photographs and specimens of the early stages were also shown. To illustrate coloration in foreign species the following were exhibited: *Mecistogaster modestus* Drury, *Megaloprepus coerulatus* Selys, *Euphaea subcostalis* (Selys), *Chalcopteryx rutilans* Ramb., *Ptetaerina americana* F., *Chlorocypha caligata* Selys., *Neurobasis chinensis* (L), and, *N. chinensis* s.sp. *kaupi* Brauer. Living examples of the hemipteron *Ilyocoris cimicoides* (L.) from South Benfleet, Essex, 23.x.60, were shown; and Coleoptera were represented by living examples of *Rhagium inquisitor* (L.) bred from larvae taken at Black Wood, Rannoch, Perthshire, 25.vii.60, together with the life history of *Dytiscus marginalis* L.

P. J. GENT—*Xanthorhoe fluctuata* L. ab. *costovata* Haw., and another lightly marked example greyish overall. *Bapta temerata* Schiff. practically devoid of markings. Typical examples of both species were shown for comparison.

Mr. B. GOATER—The following species of Lepidoptera mostly in short series, taken or bred during 1960: *Phalonia tesserana* Treits., Betchworth, Surrey; *P. roseana* Haw., bred ex *Dipsacus* spp., Scratch Wood, Middx., *P. enicana* Doubl., Curdridge, Hants; *P. hybridella* Hübn., Betchworth; *Euxanthia straminea* Haw., Mill Hill, Middx., and Winchester, Hants, *E. hamana* L., Middx., and Surrey; *E. zoegana* L., Mill Hill; *Archips oporana* L., Mill Hill; *Pandemis cerasana* Hübn., bred ex *Crataegus* spp. Ranmore, Surrey; *Cacoeconomorpha pronubana* Hübn., Cricklewood, London, N.W.; *Syndemis musculana* Hübn., Surrey and Middx.; *Clepsis consimilana* Hübn., Mill Hill; *C. costana* F., bred ex *Epilobium hirsutum* L., Watford, Herts.; *Amelia paleana* Hübn., bred ex *Trifolium* spp. and *Carduus* spp., Mill Hill; *Ptycholoma lecheana* L., bred ex *Ulmus* spp. and *Salix* spp., Mill Hill; *Pseudargyrotoza convagana* F., Betchworth; *Eulia ministrana* L., Watford and Scratch Wood; *Tortrix viridana* L., bred ex *Quercus* spp., Surrey, Herts. and Middx.; *Ptycholomoides aeriferana* H.-S., at light, Mill Hill, 1.vii.60; *Cnephasis interjectana* Haw., bred ex *Genista tinctoria* L., Scratch Wood; *Dichrorampha petiverella* L., *D. alpinana* Treits., *D. plumbagana* Treits., *D. plumbana* Scop., and *D. sequana* Hübn., all from an old railway bank, Mill Hill; *Laspeyresia succedana* Schiff., Oxshott, Surrey and Ivinghoe, Bucks.; *L. pomonella* L., melanic examples, Mill Hill; *L. splendana* Hübn., Mill Hill; *Grapholita compositella* F., Curdridge and Mill Hill; *G. jungiella* L. Scratch Wood; *Neosphaleroptera nubilana* Hübn., Kingsbury, Middx., *Rhyacionia buoliana* Schiff., from young pines on Chobham Common, Surrey; *Epiblema farfarae* Fletch., Mill Hill; *E. foenella* L., Mill Hill; *Pardia cynosbatella* L., Ranmore; *Notocelia uddmanniana* L., bred ex *Rubus fruticosus* agg., Mill Hill; *N. aquana* Hübn., bred ex *Rosa* spp., Mill Hill; *Epinotia bilunana* Haw., on birch trunks, Curdridge; *E. demarniana* F.R., one specimen found on a birch trunk, Curbridge; 6.vi.60, *Ancyliis badiana* Schiff., Scratch

Wood; *Endothenia gentianaeana* Hübn., bred ex *Dipsacus* spp., Scratch Wood; *Apotomis turbidana* Hübn., Curdridge; *A. pruniana* Hübn., Mill Hill; *Hedya salicella* L., bred ex *Salix* spp., Scratch Wood; *Celypha striana* Schiff., Betchworth; *Olethreutes lacunana* Schiff., bred ex *Filipendula* spp., Watford; *Enarmonia formosana* Scop., Mill Hill; and *Batodes angustiorana* Haw., Betchworth.

Mr. A. L. GOODSON—see Dr. H. B. D. Kettlewell.

Mr. B. S. GOODBAN and Mr. W. E. MINNION—A series of *Selenia bilunaria* Esp. from Cheshire stock with very dark forms, and a short series of a recessive melanic. A series of F₂ examples from pairings between the other two forms, showing recessive melanic with modifications, presumably from the Cheshire stock.

Mr. E. J. HARE—Lepidoptera as follows: (1) From Yarmouth, I.o.W., October 1960: *Uresiphita polygonalis* Schiff. (*gilvata* F.), also three *Agrochola lychnidis* Schiff., showing melanic tendency. (2) From Pinden, Kent: aberration of *Agrotis exclamationis* L., 24.vi.59, and *Platytes alpinellus* Hübn., 25.vi.60, an unusual locality. (3) The following taken in 1960: *Euxoa cursoria* Hufn., two examples from E. Suffolk showing extremes of size; *Rhyacia simulans* Hufn., three examples from Gloucestershire; single examples of *Leucania unipuncta* Haw. and *L. vitellina* Hübn.; two examples of *Amathes glareosa* Esp., the pink form from S. Devon; three minor aberrations of *Agrotis exclamationis* L. and a minor aberration of *A. segetum* Schiff., from Pinden, Kent; *Coenocalpe lapidata* Hübn., two males and two females from Perthshire; *Pyrausta perlucidalis* Hübn., three examples from Wood Walton Fen, Hunts.

Comdr. G. W. HARPER—(1) Lepidoptera taken or bred in 1960 in the Badenoch district of Inverness-shire: an uncommon yellowish female *Pieris napi* L., a rare all blue female *Polyommatus icarus* Rott., an immigrant female *Celerio livornica* Esp., a bred series of *Tiliacea citrargo* L., new to the area in 1959; a bred series of *Lygris prunata* L.; a series of the melanic form of *Ortholitha mucronata* Scop. s.sp. *scotica* Cockayne; two specimens of *Apamea assimilis* Doubl., illustrating the two extremes of pale and dark variation; two aberrations of *Hada nana* Hufn.; an example of the rare ab. *suffusa* Tutt of *Conistra vaccinii* L.; two *Apamea unanimis* Hübn., a new species to Badenoch, an earlier record probably being the result of a misidentification; and the second specimen to be taken of the new aberration of *Allophyas oxyacanthae* L., which was exhibited in 1958. (2) Some Lepidoptera taken in the south and west of England during a holiday in July this year: an aberrant *Fabriciana (Argynnis) cydippe* L. with very dark underside hindwings; examples of *Heliothis maritima* Grasl., *Endotricha flammealis* Schiff. and *Coscinia cribraria* L., from Wareham, Dorset, and short series of *Leucania putrescens* Hübn., *Lygephila cracca* Schiff., *Eilema caniola* Hübn., and *Euschesis (Triphaena) interjecta* Hübn., from North Devon.

Mr. M. W. HARPER—(1) *Rhodometra sacraria* L., a bred series from an immigrant female captured 31.viii.59, near Worthing, Sussex. The

pupae were divided into three groups. The first group was maintained at a temperature of 35-40° C., the second at room temperature (17-18° C.), and the third at 3-4° C. The first group produced equal numbers of typical specimens and ab. *labda* Cramer. The second group produced specimens of a fawn colour with darker brown stripe, while the third group produced specimens of a greyish ground colour with darker grey stripe. Only one example in this third group was referable to the pink form ab. *sanguinaria* Esp. The experiment demonstrates that the laying down of melanic pigment was inversely proportional to pupal temperature, but not so conclusive for pink pigmentation. (2) Lepidoptera from Inverness-shire, June 1960, including a short series of *Carterocephalus palaemon* Pall., the melanic form of *Ortholitha mucronata* Scop. s.sp. *scotica* Cockayne, and *Udea* (*Hapalia*) *decrepitalis* H.-S.; two specimens of *Euschesis* (*Triphaena*) *sobrina* Boisd., bred from larvae found at night on small birches; single specimens of *Xanthorhoe spadicearia* Schiff. ab. *salicaria* Haworth, *Electrophagus corylata* Thunb. ab. *albocrenata* Curt. (*effusaria* Strand.), *Pseudopanthera macularia* L., a confluent aberration. (3) Lepidoptera from South Uist and the Outer Hebrides, July 1960, including a short series of *Dysstroma concinnata* Steph., and a dark race of *Euphyia bilineata* L., single specimens of *Alcis repandata* L., and *Abraxas grossulariata* L. The first three species mentioned were all sitting on rocks and all were moorland species. (4) Miscellaneous Lepidoptera, including a short bred series of melanic *Alcis repandata* L. from larvae found in N.W. London; two specimens of *Lysandra coridon* Poda, including an ab. *fowleri* South; single specimens of *Lycaena phlaeas* L. captured 30.viii.47 and shown as an upperside aberration the same year (1949, *Proc. S. Lond. ent. nat. Hist.*, 1947-8: 29), now shown as an underside; and *Operophtera brumata* L., an intersex, mainly female, with marked enlargement of the fore and hindwings on the right side; finally two examples of *Zygaena trifolii* Esp. ab. *lutescens* Cockerell captured 29.v.60, Surrey, together with two specimens of pink coloration bearing no resemblance to specimens suffering from weather exposure.

Mr. ROGER HAYWARD—Lepidoptera as follows: *Pararge megera* L. ab. *xanthos* Frohawk, Portsdown, Hants, 23.viii.55, and a typical example from the same locality, June 1953; *Coenonympha pamphilus* L. aberration with the upperside of the hindwings showing ocelli, Portsdown, 26.vii.59, another aberration with blackish suffusion, also Portsdown, 24.vii.56, and a typical example from Swanage, Dorset, 8.ix.55; *Mesoacidalia* (*Argynnis*) *charlotta* Haw. (*aglaia* L.) f. *scotica* Watkins, Wickham, Hants, 16.vii.60, with a typical example from Portsdown, 2.vii.57; *Argynnis paphia* L., underside of left hindwing showing homöesis above vein six, New Forest, Hants, 9.vii.60; *Plebejus argus* L., aberration with orange markings on right wings replaced by white, Portsdown, 28.vi.59, another aberration showing markings visible on forewings and blue areas above orange band on hindwings, Portsdown, 3.vii.60, with a typical example also from Portsdown, June 1953; *Lycaena phlaeas* L. ab. *obsoleta* Tutt, first brood, New

Forest, 25.v.60, with a typical example from Swanage, 24.ix.60; *Colias croceus* Fourc., aberration showing black markings of hindwings almost completely replaced by lemon yellow, and heavy clouding of lemon yellow at apex, Swanage, 23.ix.60 (Plate I, fig. 3), with a typical example from Swanage, 23.ix.60; *Herse convolvuli* L., Tresco, Seilly Isles, 19.ix.59, Portsmouth, 17.ix.60, and Swanage, 19.ix.60; *Arctia caja* L., aberration showing maximum extent of natural variation to date in trapped specimens, Portsmouth, 8.viii.59, with typical example from same locality, 9.viii.58; *Agrotis exclamationis* L. ab. *plaga* Steph., Portsmouth, 6.vi.60, with a typical example from same locality, 2.vi.60; *Mamestra brassicae* L., aberration showing extensive areas of grey and white shading on forewings, Portsmouth, 8.viii.59, with a typical example from the same locality, 9.vii.58; *Discestra trifolii* Hufn., aberration showing markings of right forewing washed out and obscured, Portsmouth, 22.viii.60; *Leucania albipuncta* Schiff., Portsmouth, 8.x.59; *Laphygma exigua* Hübn., Swanage, 8.ix.57, and Portsmouth, i.vii.57; *Procus literosa* Haw., melanic aberration, Portsmouth, 31.viii.60, with a typical example from the same locality, 30.vii.60; *Cryphia perla* Schiff., white form, Portsmouth, 6.viii.60, white and ochreous form, Portsmouth, 5.vii.59, grey and ochreous form, Portsmouth, 6.viii.59, grey form, Portsmouth, 17.vi.59; *Aplasta ononaria* Fuessl., Portsmouth, 15.viii.59; *Sterrhia humiliata* Hufn., Portsmouth, 1954, no further data available as no detailed records kept prior to end of 1955; *Colostygia pectinataria* Knoch, showing homoeosis on left hindwing, Stansted Forest, Hants, 26.v.56; *Eupithecia absinthiata* Clerck, banded form, Portsmouth, 17.vii.59, with a typical example from the same locality, 30.vii.60.

MR. C. R. HAXBY—(1) *Polia nebulosa* Hufn. showing extent of variation in a large number reared from larvae from Deffer Wood, S.W. Yorks., as a result of Mr. B. Goater's query (1960, *Entomologist*, 93:214). (2) *Coenonympha tullia* Müll., a series from Goathland, Yorks., 21.vi.59.

MR. I. R. P. HESLOP—The following British Rhopalocera all taken wild by the exhibitor: (1) a female *Colias australis* Verity, taken on the downs above Polruan, S. Cornwall, 23.viii.60. (2) A male *Danaus plexippus* L., taken at Burnham-on-Sea, Somerset, 18.x.58. (3) A male aberration of *Apatura iris* L. ab. *maximinus* Heslop (1960, *Entomologist*, 93:251) taken in Wiltshire, 25.vii.60, together with a large typical male and female for comparison. (4) A series of five examples of *Aglais urticae* L., grading from extreme 'black' to extreme 'white', all taken in Somerset between 1950 and 1960 (both years inclusive). These comprise *forma typica*, ab. *nigra* Tutt, ab. *seminigra* Frohawk, ab. *semialba* Frohawk, and ab. *bellieri* Cabeau (*alba* Raynor).—See also Mr. R. E. Stockley.

MRS. E. A. HESLOP—The following British Rhopalocera taken by John Heslop: (1) A very fine, large, typical male *Apatura iris* L., Wiltshire, 30.vii.57. (2) A dwarf male *Polygonia c-album* L. ab. *hutchinsoni* Robson, Wiltshire, 27.vii.60.

Mr. & Mrs. T. G. HOWARTH—A teratological example of *Maniola jurtina* L., with wavy veins. The specimen, a female, was captured at Arkley, Herts., 3.vii.60. It seems as if very few examples of this kind of abnormality are known.

Mr. G. R. HYDE—see Mr. R. E. Stockley.

Capt. R. A. JACKSON—An aberration of *Mesoacidalia (Argynnis) charlotta* Haw (*aglaia* L.), female with heavy dark markings on a yellowish ground colour, the marginal lunules being very pale yellow. He also showed an aberration of *Arctia caju* L. taken wild, in which the white markings on the forewings were much reduced, the hindwings yellowish-orange with heavy marginal spots confluent. Both specimens were taken at Codford St. Mary, Wilts.

Mr. S. N. A. JACOBS—A collection of microlepidoptera from the Lillehammer district of Norway.

Mr. F. V. L. JARVIS—(1) Three males and two females of *Aricia agestis* Schiff. s.sp. *artaxerxes* F., collected by Mr. L. Christie and Mr. M. W. F. Tweedie in Sutherland, July 1960. From one female 25 fertile ova were obtained. Ova and the resulting larvae were kept in continuous light, using a 60-watt lamp, eight inches from the subject between sunset and sunrise, maintaining a temperature of 75° F. Diapause was completely suspended and 22 imagines were obtained at the end of September 1960. This race differs from s.sp. *artaxerxes* from southern Scotland (shown as a comparative series) in the larval colouring and in several imaginal characters. From nine ova of *A. agestis* collected at Blackhall on the Durham coast, 10.vii.60, nine imagines emerged at the end of September 1960, by using the same method of continuous light. The Sutherland and Blackhall series (ab. *salmacis* Steph.) were exhibited. A Sutherland *artaxerxes* male and a Durham female were paired, 24.ix.60. About 70 ova were laid in the next few days. Again by suspending diapause with continuous light at 75° F. practically all the larvae grew without check. Specimens of adult cross-bred larvae were exhibited. The exception was a batch of five larvae from ova which had been subjected for three days to the normal day and night rhythm. These larvae entered diapause in instar III. Emergence from the cross-bred larvae is expected in mid-November. In normal conditions of daylight and temperature both the Sutherland and Durham races of *A. agestis* are univoltine. (2) Two living imagines of *Lysandra coridon* Poda, the first to emerge from an experimental second brood raised in continuous light at 75° F. Ova deposited 24.viii.60. Emergences from 29.x.60. A hundred per cent suspension of diapause was obtained.

Mr. C. JOHNSON—A selection of some Coleoptera taken by the exhibitor this year. Of particular note are several local species which occur on the sand dunes at Freshfield, just south of Southport, Lanes. They include *Cicindela hybrida* L., *Broscus cephalotes* (L.), *Demetrias atricapillus* (L.), *Harpalus neglectus* Serv., *Saprinus rugiceps* (Dufts.), *Aegialia arenaria* (F.), *Chilocorus bipustulatus* (L.), as well as more

common species like *Melanimon tibiale* (F.), *Phylan gibbus* (F.), *Philopodon plagiatus* (Schall.), *Orobitis cyaneus* (L.), *Sitona griseus* (F.), *S. macularius* (Marsh.) (*crinitus* (Herbst)), and *Cryptocephalus fulvus* Goeze. Also from Freshfield, the attractive longhorn, *Aromia moschata* (L.) and the scarce *Arhopalus* (*Criocephalus*) *ferus* (Muls.), which is abundant in the pines. The second species of *Arhopalus*, *A. rusticus* (L.) (mainly a Scottish species), is from Petty Pool, Cheshire. It occurs also at Delamere, but is uncommon. Another scarce longhorn, bred from a Petty Pool larva is *Saperda scalaris* (L.). The larvae of this species are not very difficult to find, although it is hard work. Also from the same locality is *Megatoma undata* (L.). Several species from Delamere, Cheshire, were also shown: *Hylecoetus dermestoides* (L.), *Asemum striatum* (L.) (bred from pupae), *Leistus spinibarbis* (F.) and *Librodor quadriguttatus* (F.). Of the moorland species several are very local, like *Miscodera arctica* (Payk.), *Trechus rubens* (F.) from Shaw, Lancs.; *Aphodius lapponum* (Gyll.), *A. tenellus* Say., *A. depressus* (Kug.), *Timarcha goettingensis* (L.), from the Glossop area, Derbyshire; and *Carabus arvensis* Herbst s.sp. *sylvaticus* Dej. from Hoo Moor, Goyt valley, Derbyshire. By far, one of the best Cheshire species is *Chrysolina fastuosa* (Scop.) from Carrington Moss; just one specimen was obtained last year but they were fairly plentiful this year. Also from this Moss was *Hister purpurascens* Herbst. Various other interesting species include *Judolia cerambyciformis* (Schrank), *Aphodius plagiatus* (L.), *Melasis buprestoides* (L.), *Ctenicera* (*Corymbites*) *pectinicornis* (L.), from the Wyre Forest, Salop; *Athous hirtus* Herbst, *Amara aulica* (Panz.) from Bagley Wood, Berks.; and *Carabus granulatus* L. from Alderley Edge, Cheshire. Bred specimens include *Pyrochroa coccinea* (L.), ex pupa, Wyre Forest; *Melandrya caraboides* (L.), ex larva, Goyt valley; *Hylobius abietis* (L.), ex larva, Delamere; *Leipus nebulosus* (L.), ex larva, Torside Clough; *Saperda scalaris* (L.), ex larva, Petty Pool; *Asemum striatum* (L.), ex pupae, Delamere; *Arhopalus* (*Criocephalus*) *ferus* (Muls.), ex larvae, Freshfield; *Leistus rufescens* (F.), ex larva, Glossop.

Major-General Sir GEORGE F. JOHNSON—Rhopalocera caught between 7th July and 18th July this year at Abisko, Swedish Lapland, 120 miles north of the Arctic Circle. Short series of *Colias palaeno* L., *C. nastes* Boisd. s.sp. *verdandi* Zett., *C. hecla* Lef., *Boloria pales* Schiff. and the s.sp. *sifanica* Gr.-Gr., *Erebia lignea* L., *E. pandrose* Esp., *Lycaeides idas* Rambur, and *Lycaena optilete* Knoch; pairs or individual examples of *Clossiana freija* Thunb., *C. improbula* Bryk, *C. euphrosyne* L., *Oeneis jutta* Hübn., *O. norna* Thunb., *Euphydryas idune* Dalm. and *Pyrgus andromedae* Wallengr.

Mr. H. A. KENNARD—(1) A selection of Lepidoptera from St. Kilda during August and September 1960, with specimens from Benbecula for comparison: *Cerapteryx graminis* L., *Diarsia mendica* F. (*festiva* Schiff.), *Paradrina* (*Caradrina*) *clavipalpis* Scop., *Euschesis* (*Triphaena*) *comes* Hübn., *Apamea monoglypha* Hufn., *Xanthorhoe munitata* Hübn., *Colostygia didymata* L., *Lygris testata* L. and *Hydraecia paludis* Tutt. (2) Lepidoptera from St. Kilda only, August and September 1960:

Amathes glareosa Esp. and *A. xanthographa* Schiff. (3) Lepidoptera from Benbecula and South Uist, May to August 1960: *Diarsia rubi* View., *Agrotis vestigialis* Hufn., *Euxoa tritici* L., *Luperina testacea* Schiff., *Perizoma albulata* Schiff., *Abraxa grossulariata* L., *Selidosema brunnearia* Vill. (*plumaria* Schiff., auct. nec Schiff.), *Rheumaptera* (*Eulype*) *hastata* L. s.sp. *nigrescens* Cockerell, *Epirrhoë alternata* Müll. ab. *obscurata* South, *Xanthorhoë montanata* Schiff. ab. *shetlandica* Weir, *Lyncometra ocellata* L., *Carsia sororiata* Hübn. (*paludata* Thunb.), *Euphyia bilineata* L. ab. *atlantica* Staud. and *Coenonympha tullia* Müll.

Dr. H. B. D. KETTLEWELL & Mr. A. I. GOODSON—Lepidoptera from the Rothschild-Cockayne-Kettlewell Collection: *Ogenia mendica* Clerck, hindwing with terminal row of spots, Tring, Herts., Goodson; *Orthosia advena* Schiff., with extreme banding, Tring, 15.v.60, Goodson; *Lithina chlorosata* Scop., melanic form, Tring, 14.v.60, Goodson; *Agrotis exclamationis* L. ab. *lineolatis* Tutt, Tring, 9.vii.60, Goodson; *Apatele leporina* L. ab. nov., Tring, 23.vi.60, Goodson; *Deilinia* (*Cabera*) *pusaria* L. ab. *inornata* Meves, Tring, 7.vii.60, Goodson; *D.* (*C.*) *pusaria* L. ab. *heveraria* H.-S., Tring, 7.vi.60, Goodson; *Itame brunneata* Thunb., (*fulvaria* Vill.), continental immigrant, Tring, 2.vii.60, Goodson; *Ochropleura plecta* L., costal streak reduced to thin line, Tring, 8.vii.60, Goodson; *Apatele rumicis* L. ab. nov. with pale margins, Ham Street, Kent, 18.vi.60, James Cadbury; *Aethalura punctulata* Schiff. ab. *intermedia* Lempke, with typical example for comparison, Tring, 7.v.60, Goodson; *Spilosoma lubricipeda* L. with darkened terminal area, underside more extreme, Tring, 6.vi.60, Goodson; *Euxoa nigricans* L., ab. *striata* Tutt, Tring, 8.viii.60, Goodson; *Plusia interrogationis* L., continental immigrant, Tring, 19.viii.60, Goodson; *P. gamma* L. ab. *nigricans* Spuler, Eastbourne district, Sussex, October 1960, Kettlewell; *Drepana lacertinaria* L., median lines greatly approximated, Tring, 2.viii.60, Goodson; *Amathes glareosa* Esp., somatic mosaic (typical form and ab. *edda* Staud. combined), Shetland, September 1960, James Cadbury on Kettlewell expedition; *A. xanthographa* Schiff. ab. *nigra* Tutt, a large form from Shetland, September 1960, James Cadbury on Kettlewell expedition; *Ellopija fasciaria* L., white transverse lines developed, Eastbourne district, October 1960, Kettlewell.

Mr. R. P. KNILL JONES and Mr. S. A. KNILL JONES—A selection of Lepidoptera taken during the last eight years, and not previously exhibited: *Vanessa atalanta* L., a remarkable specimen showing variation towards ab. *klemensiewiczzi* Schille, on the right side only, the left side being normal, taken on *Buddleia* at Freshwater, I.o.W., 24.viii.55; *V. huntera* F. a very good specimen taken in their garden at Freshwater, 19.viii.56, the second record for the Isle of Wight; *Notodonta tritophus* Schiff. (*phoebe* Sieb.), mercury vapour light trap, Freshwater, 20.viii.56, the last two species have been recorded and illustrated (1957, *Ent. Rec.* 69:74 and Pl.1); a female aberration of *Gonodontis bidentata* Clerck, in which a single narrow band of dark

grey replaces the cross-lines on all wings, the ground-colour featureless light fawn; also a typical female for comparison, both from an otherwise normal brood in May 1955, from eggs obtained by Mr. D. A. Eckford from a normal female taken at Boston, Lincs.; *Abraxas grossulariata* L., a male aberration closely approaching *ab. albomarginata* Raynor, taken on the Isle of Wight, 1952, also a less extreme female example of the same aberration taken at rest on *Euonymus europaeus* L., Bewdley, Worcs., 15.vi.58; an unusual aberration of *Opisthograptis luteolata* L., a female with white hairs replacing yellow on the upper surface of the head and thorax, and on the tip of the abdomen, features noted to be present before death, Cleveland Stones, Malvern, Worcs., 21.vi.60; *Arenostola pygmina* Haw., a deep golden-red form with dark grey hindwings, at rest on *Carex*, Keswick, Cumb., 7.ix.59, with a typical example from the same area; a short series of *Oporinia filigrammaria* H.-S. from a small colony at 2,400 ft., Skiddaw, Cumb., 3.ix.59; *Tethea fluctuosa* Hübn., from larva, Keswick, Cumb., 10.v.60. The following species were taken in a mercury vapour light trap unless otherwise stated: *Acherontia atropos* L., Keswick, 8.ix.59, *Herse convolvuli* L., Keswick, 8.ix.59, also a male, female and preserved larva, bred during late autumn 1957, from a female taken at Freshwater, I.O.W.; *Celerio galii* Schiff., Freshwater, 14.vii.55; three examples of *Notula albula* Schiff., from Freshwater 6.viii.58; *Noctua pronuba* L., an aberration with lemon-yellow hindwings, Freshwater, 8.viii.58; a dark-grey suffused form of *Hada nana* Hufn., Malvern, Worcs., 18.vii.58, with the typical form from the same area; two *Xylomiges conspiciellaris* L., from the grounds of Malvern College, May, 1956 and 1958; *Luperina dumerilii* Dup., Bolberry, Salcombe, Devon, 10.ix.59, a grey form of *Gortyna (Hydraccea) micacea* Esp., Doncaster, Yorks., 13.ix.59; *Chilodes maritima* Tausch., Freshwater, August 1959 and 1960; four *Leucania faveicolor* Barr., Freshwater, August 1959; *L. unipuncta* Haw., Freshwater, three September 1957 and three examples from four taken in September 1960; two *L. vitellina* Hübn., Freshwater, 2.ix.58 and 30.viii.60; two *L. albipuncta* Schiff., Freshwater, 26.viii.57 and 3.x.59; *Laphygma exigua* Hübn., Freshwater, one 8.ix.58 and a female 28.viii.59, from which were obtained the three imagines and three preserved larvae also shown; *Acosmetia caliginosa* Hübn., Freshwater, July 1956; *Orthosia advena* Schiff. (*opima* Hübn.), two *ab. brunnea* Tutt. and two of the usual grey form, Freshwater, March 1956 and April 1957; two *Dasycampa rubiginea* Schiff., Freshwater, 21.iv.55 and 24.iii.59; *Catocala sponsa* L., Freshwater, 12.viii.58, apparently only the third record for the Isle of Wight; *Plusia limbirena* Guen., Freshwater, 26.viii.60; three *Hapalia fulvalis* Hübn., Freshwater, 1.ix.58, 16.viii.59 and one disturbed from a hedge in August 1955; *Antigastra catalaunalis* Dup., two from Mawgan, Helston, Cornwall, 10 and 11.ix.56, and one from Freshwater, 14.ix.58—the three last-named species having not previously been recorded

from the Isle of Wight; a series of *Palpita unionalis* Hübn., Fresh-water, August and September 1955 and 1957-60.

Mr. M. J. LEECH—The following Lepidoptera: From Wicken Fen, Cambs.: a gynandromorphous example of *Gonepteryx rhamni* L., left side male, right side female, together with a typical specimen of each sex; a series of *Arenostola phragmitidis* Hübn., and a series of *Nonagria dissoluta* Triets. From Owston Woods, Leices.: a bred series of *Polygonia c-album* L.; a female *Maniola jurtina* L., showing considerable bleaching on the right side; a series of *Aphantopus hyperantus* L., showing underside forms; a specimen of *Hadena contigua* Schiff., a series of *Cosmia pyralina* Schiff.; specimens of *Polia nitens* Haw. From Duddington, Rutland: a bred series of *Triphosa dubitata* L., and a series of *Strymonidia pruni* L. From Formby, Lancs.: a short series of *Rhizedra lutosa* Hübn. From Delamere, Cheshire: a short bred series of *Rheumaptera undulata* L. From Dunstable, Beds.: a specimen of *Lysandra coridon* Poda ab. *semisyngrapha* Tutt, and specimens of *Eremobia ochroleuca* Schiff. From Castor Hanglands, Soke of Peterborough: a series of *Arenostola fluxa* Hübn., together with a series of *Thymelicus sylvestris* Poda. From Wood Walton Fen, Hunts.: *Eilema complana* L. and *E. griseola* Hübn. From Barnack, Soke of Peterborough: an unusual underside form of *Maniola jurtina* L., the usual orange coloration being replaced by a dusky yellow; also specimens of *Thymelicus lineola* Ochs. From Mildenhall, W. Suffolk: a short series of *Cirrhia ocellaris* Borkh.

Mr. IAN LORIMER—See Mr. R. M. MERE.

Lt.-Col. & Mrs. W. B. L. MANLEY—A selection of butterflies taken in Spain during the summer of 1960 consisting of a series of each of the following species and subspecies: *Parnassius apollo* L. s.sp. *nevadensis* Oberth., a race which occurs locally on the Sierra Nevada; the usual red spots of the females are replaced with orange in the majority of the specimens; this difference is much less marked in the males. *P. apollo* s.sp. *asturiensis* Pagenstecher; this subspecies comes from the Cantabrian Mountains. *Melitaea desfontainii* Godart, from Teruel; this unnamed race differs from the south Spanish race in that the undersides of the wings are much more heavily marked. *M. trivia* Schiff., from Leon on the southern slopes of the Cantabrian Mountains, where it is locally common at around 3,600 ft. *Erebia palarica* Chapman; although this species is regarded in this country as coming only from the Puerto de Pejares in Oviedo, the exhibitors found it to be abundant in the Provinces of Leon, Santander and Valencia between 3,300 and 5,800 ft. *E. gorge* Esp, s.sp. *gigantea* Oberth.; this race comes from the Picos de Europa in Santander and, as its name suggests, it is much larger than other races of the species. *Satyrus actaea* Esp. s.sp. *podarcina* Fruhstorfer, from Sierra de Alfacar near Granada. *Epinephele lycaon* Rott., a series from Leon where the females are much less heavily marked than in the race *boopis* Sheldon from Albarracin. *E. lupinus* Costa, from the Sierra de Alfacar. *Laeosopis roboris* Esp., a series from Riano, Leon; Spanish specimens are generally larger than

those from France. *Thecla spini* Schiff. s.sp. *lynceus* Hübn., this species is abundant around Riano where all the females have at least a small patch of fulvous colouring on the upperside of the hindwings; some of those shown have nearly all the upper surfaces of all four wings of this colour. *Heodes hippothoe* L., this species is common in damp valleys around 5,000 ft. in Leon and Santander; one small colony produced one aberration in every eight or ten examples examined; some of these were exhibited. *H. virgaureae* L., very abundant in the Province of Leon where most of the males have three additional small black spots towards the apex of the forewings. *Plebejus pyrenaica* Boisd. s.sp. *asturiensis* Oberth., this is the local race from the higher altitudes of the Pico de Europa. *Polyommatus escheri* Hübn. s.sp. *agenjou* Higgins; Dr. L. G. Higgins first noted this small race from the Sierra Nevada in 1948; it is to be found at about 8,500 ft., elsewhere in the district specimens are much larger. *P. argester* Bergstr. s.sp. *atlantica* Elwes., this insect is common around 8,500 ft. on the Sierra Nevada; although it is generally accepted as a subspecies of *P. argester* Bergstr., the exhibitors consider that it may be specifically distinct; this is suggested by the shape of the wings, the colour of the males, the underside markings and by the fact that the females are plentiful, whereas the females of *P. argester* are usually difficult to find.

Lt.-Col. W. B. L. MANLEY—A specimen of *Cnephasia gueneana* Dup., a tortricid moth previously unrecorded in Britain. It had been bred from a larva found in Jonquils and Anemones purchased in London, S.W.1., February 1960, of unknown origin.

Dr. B. J. MACNULTY—West African Lymantriidae (Lep.) represented by 107 species in 30 different genera, some of which are the exhibitor's additions to the West African list.

Rev. J. N. MARCON—Lepidoptera as follows: *Clossiana (Argynnis) euphrosyne* L., a male with banded and blotched forewings and dark hindwings; another male with the outer row of spots becoming confluent with marginal spots; *C. (A.) selene* Schiff., a male nicely banded on all four wings, and spots on forewings coalescent near the base.

Captain D. G. MARSH—A short series of *Earias clorana* L., taken in a light trap at Ickham, Kent, 1960; *Evergestis extimalis* Scop., taken on a bombed site, Dover, Kent, 1960; *Anthophila pariana* Clerck, taken in a garden, Ickham; four *Bombycia viminalis* F., including one banded form and two melanic forms, Witherslack, Westmor., 1960; three *Aporophyla lutulenta* Schiff., including one unusual grey aberration determined by Mr. W. H. T. Tams, from a trap at Ickham, 1960; two *Apamea assimilis* Doubl., from Dalwhinnie, Inverness-shire, 1959; a short series of aberrations of *Cerapteryx graminis* L., from Aviemore, Inverness-shire, 1959, and an extreme aberration taken by the late Wilfred Cope at Royston, Herts., 1931; a short series of *Lophopteryx cucullina* Schiff., including an extreme pale aberration; two typical *Colocasia coryli* L. and one non-banded form; and two *Plusia bractea* Schiff., one with silver spots and the other typical, from Aviemore, 1959.

Dr. A. M. MASSEE—The weevils contained in the genera *Bagous* and *Hydronomus* (Curculionidae) include some of the rarest species of British Coleoptera, and it is exceptional to find more than two or three species in British collections. All the species are aquatic or sub-aquatic and are extremely sluggish in their habits; they have no power of swimming, but cast themselves off their host-plants and allow the current to carry them along. These weevils occur at the banks of rivers, ponds and more especially in sphagnum in bogs. They are also found in dykes and some species are locally common in the dykes at Higham marshes, near Gravesend, Kent. The dykes on Pevensey marshes, Sussex, and in the bogs in the New Forest, Hants, may be regarded as the headquarters of these interesting weevils. They are difficult to collect because of their sluggish habits, but some species can be obtained by sifting sphagnum, moss, etc., through a fine mesh sieve onto a sheet, when after some time any weevils present will become active and are then readily detected. On hot, oppressive days in June the weevils climb up the stems of aquatic plants, and on such occasions may be obtained by sweeping. On one such occasion no less than seven species were obtained in one day at Higham marshes. These insects can also be obtained by trapping: balls of sphagnum (tied with string, and weighted with a stone) can be put in dykes and ditches and left for two or three weeks. These can then be taken home and examined at leisure. Some good species may be taken by this device. The known host plants of the adult weevils are as follows: *Hydronomus alismatis* (Marsh.), *Alisma plantago-aquatica* L. (Water Plantain); *Ephimeropus petro* (Herbst), *Utricularia vulgaris* agg. (Greater Bladderwort), *Ceratophyllum submersum* L. (Horn-wort) and *Elodea canadensis* Michx. (Canadian Pondweed); *Bagous cylindrus* (Payk.), *Callitriche* spp.; *B. frit* (Herbst), host plant not known; *B. collignensis* (Herbst), *Equisetum fluviatile* L. (Water Horsetail); *B. subcarinatus* (Gyll.), *Ceratophyllum submersum* L. (Horn-wort); *B. lutulosus* (Gyll.), *Juncus subnodulosus* Schrank (Blunt-flowered Rush); *B. tempestivus* (Herbst), *Potamogeton densus* L. (Opposite-leaved Pondweed) and *P. pectinatus* L. (Fennel-leaved Pondweed); *B. limosus* (Gyll.), *Potamogeton lucens* L. (Shining Pondweed) and *P. natans* L. (Broad-leaved Pondweed); *B. diglyptus* Boh., *Cladium mariscus* (L.) Pohl. (Sedge); *B. nodulosus* Gyll., *Butomus umbellatus* L. (Flowering Rush); *B. binodulus* (Herbst), *Stratiotes aloides* L. (Water Soldier); *B. argillaceus* Gyll., host plant not known; *B. lutosus* (Gyll.), *Sparganium ramosum* Huds. (Bur-reed); *B. glabrirostris* (Herbst), *Stratiotes aloides* L. (Water Soldier); *B. puncticolis* Boh., *Stratiotes aloides* L. (Water Soldier) and *Elodea canadensis* Michx. (Canadian Pondweed) and *Hydrocharis morsus-ranae* L. (Frogbit); *B. lutulentus* (Gyll.), *Equisetum fluviatile* L. (Water horsetail); *B. longitarsis* Thom., *Equisetum fluviatile* L. (Water horsetail).

Mr. PATRICK MATTHEWS—Volume I of a series of scrapbooks for which the exhibitor has collected articles from magazines, letters, photographs, paintings, newspaper cuttings, etc., all of which include

butterflies and moths in some form. In this particular scrapbook are examples of butterflies and moths used in decoration schemes, textile designs (the earliest shown is dated 1645), reproductions of Old Masters (the earliest of which is a Pisano, circa 1400), and in advertising; also on Christmas cards, birthday cards, foreign stamps, etc. More personal are the Press cuttings of "The Pursuit of Moths and Butterflies" published in October 1957 by Chatto and Windus, a copy of which was presented by the author to the Society during the same year.

Miss C. A. McDERMOTT—The following Heteroptera: *Pachytomella parallela* M.-D., near Betty Hill, Sutherland, 22.vi.60; *Chlamydatus wilkinsoni* (Douglas & Scott), Inchnadamph, Sutherland, 14.vi.60; *Saldo morio* Zett., near Betty Hill, 25.vi.60; *Saldula scotica* (Curt.), bred from nymph found by Loch Assynt, Sutherland, 25.vi.60.

Mr. R. M. MERE—Lepidoptera as follows: a series of *Diarsia mendica* F. (*festiva* Schiff.), and a series of *Lasiocampa quercus* L., from Tresco, Scilly Isles; *Harpyia bicuspis* Bork., *Cirrhia gilvago* Schiff., *Pelosia muscerda* Hufn., a melanic *Asphalia diluta* Schiff., *Luperina testacea* Schiff., and *Agrochola lychnidis* Schiff.; a bred series of *Pammene aurantiana* Staud.; *Itame brunneata* Thunb., continental form from the Folkestone Warren, Kent; *Epischnia* (*Dioryctria*) *banksiella* Richardson; *Orthosia gracilis* Schiff.; a series of *Pediasia* (*Crambus*) *contaminella* Hübn., including melanics from London; and a bred series of *Perizoma sagittata* F. For Mr. IAN LORIMER—*Leucania unipuncta* Haw., from Portland, Dorset and Tresco, Scilly Isles, those from the former locality having a very small or obscured white dot.

Mr. W. E. MINNION—see Mr. B. G. GOODBAN.

Mr. J. L. MESSENGER—(1) Various migrant, or presumed migrant, Lepidoptera taken during 1960 as follows: *Herse convolvuli* L., two examples from Studland, Dorset; *Leucania unipuncta* Haw., an example from Portland, Dorset; *L. vitellina* Hübn., two from Studland; *Itame brunneata* Thunb., a specimen probably of continental origin taken at Witley, Surrey, 23.vi.60. (2) A selection of Lepidoptera taken in the Highlands of Scotland during April 1960: single examples of *Endromis versicolora* L., *Phragmatobia fuliginosa* L., bred, *Amathes alpicola* Zett., bred, *Anarta melanopa* Thunb., bred; short series of the local forms of *Orthosia incerta* Hufn., *O. gothica* L., *Cerastis rubricosa* Schiff., *Trichopteryx carpinata* Borkh. and *Lampropteryx suffumata* Schiff.; and three specimens of *Brachionychna nubeculosa* Esp., two of *Dasypolia templi* Thunb., from the Aviemore district of Inverness-shire, and a short series of *Poecilopsis lapponaria* Boisd., from Perthshire. (3) A selection of aberrant Lepidoptera taken at Witley, Surrey, during 1960: *Spilosoma lutea* Hufn., a specimen devoid of upperside dark markings except for a small black mark on the costa near the base; *Arctia caja* L., a specimen with the dark blotches on the centre of termen missing, and a dark specimen closely resembling that illustrated by South (*The Moths of the British Isles*, 1939 Ed. Series I, plate 84, fig. 1); *Macrothylacia rubi* L., a very dark female with the first line absent and the second line only faintly indicated; *Xanthorhoe designata*

Hufn., a form without definite markings other than a very narrow irregular central fascia; *Semiothisa liturata* Clerck, a form possibly referable to ab. *nigrofulvata* Collins.

Mr. M. G. MORRIS—Species of Weevils (Curculionidae) to illustrate the adaptations to aquatic life shown by the group. The species shown are arranged in order of increasing aquatic specialisation, culminating in *Eubrychius velatus* (Beck) which has a most efficient type of plastron respiration (Thorp & Crisp (1949, *J. exp. Biol.*, **26**: 219-260)). The exhibit starts by showing how in one genus a species may be more aquatic than its congeners because of its attachment to a more aquatic foodplant. Species are shown which have only the slightest relation to water, both fresh and sea water. It is suggested that the influence of foodplant is important in considering the aquatic associations of these species. Weevils which live aquatic lives, but are unable to swim; those which are active swimmers; and finally those with respiratory adaptations to aquatic life are considered. The following are some of the more aquatic species exhibited: *Lixus paraplecticus* (L.) *Bagous* (*Cyprus*) *cylindrus* (Payk.), *B.* (*Bagous*) *argillaceus* Gyll., *B.* (*P.*) *limosus* (Gyll.) *B.* (*B.*) *frib* (Herbst), *B.* (*Probagous*) *tempestivus* (Herbst), *B.* (*P.*) *heasleri* Newb., *Hydronomus alismatis* (Marsh.), *Tanysphyrus lemnae* (Payk.), *Litodactylus leucogaster* (Marsh.), *Eubrychius velatus* (Beck), *Drupenatus nasturtii* (Germ.), *Poophagus sisymbrii* (F.) and *Stenopelmus rufinasus* Gyll.

Mr. F. A. NOBLE and Mr. S. E. W. CARLIER—A selection of Lepidoptera captured during 1959 and 1960 when working the main limestone area of the Birmingham plateau. The plateau is an area in the west Midlands mostly above the 300 ft. contour with Birmingham situated, more or less, in the centre. Parts of the plateau are near 900 ft., and those under 300 ft. are where rivers have worn valleys in the plateau. It was felt that the plateau had a number of interesting features, such as its height and the effect on weather conditions, and large industrial areas, which would make research into its lepidopterous population of interest to people throughout the country. It is in the course of this survey that we have worked the southern tip of the plateau over the last two years. This is the only limestone area on the plateau large enough to have any effect upon the lepidopterous population. Open country and woodland were worked; mostly at night with a mercury vapour lamp or with sugar. The following are the species exhibited: *Earophila badiata* Schiff., a range of forms, one very light; *Anticlea derivata* Schiff.; *Selenia tetralunaria* Hufn., showing evidence of melanism; *Biston strataria* Hufn.; *Lycia hirtaria* Clerck.; *Xylocampa areola* Esp.; *Cucullia chamomillae* Schiff.; *Polyplocia ridens* F.; *Orthosia advena* Schiff.; *O. incerta* Hufn.; *O. munda* Schiff.; *O. populeti* F.; *O. gracilis* Schiff.; *O. gothica* L.; *Diurnia fagella* F.; *Heliozela sericiella* Haw.; *Eriocrania salopiella* Staint.; *Acleris ferrugana* Schiff. & Denis; *Depressaria chaerophylli* Zell., a new record; *Epigraphia steinkelleriana* Schiff., a new record. All these moths were taken in March and April. The following are a

selection of species recorded for May: *Biston betularia* L., one ab. *insularia* Th.-Meig., and one melanic form showing traces of white; *Menophra abruptaria* Thunb.; *Selenia lunaria* Schiff.; *Anagoga pulveraria* L.; *Anaitis plagiata* L.; *Plagodis dolabraria* L.; *Rheumaptera hastata* L.; *Lobophora halterata* Hufn.; *Xanthorhoe montanata* Schiff. ab. *limbaria* Hübn.; *X. spadicearia* Schiff.; *Eupithecia insigniata* Hübn., a new record; *Asthenes albulata* Hufn.; *Perizoma flavofasciata* Thunb.; *Celama confusalis* H.-S.; *Pheosia gnoma* F.; *P. tremula* Clerck; *Lophopteryx capucina* L.; *Notodonta ziczac* L.; *Drepana falcataria* L.; *Dasychira pudibunda* L.; *Apatele alni* L.; *Harpyia bifida* Brahm (hermelina Goeze preoccupied); *Chaonia ruficornis* Hufn., three examples showing variations; *Meristis trigrammica* Hufn.; *Clostera curtula* L.; *Agrotis puta* Hübn.; *Mimas tiliae* L.; *Nemotois degeerella* L.; *Ancylis lactana* F.; *Apotomis* (Argyroploce) *pruniana* Hübn.; *Nemophora panzeriella* F. (schwarziella Zell.); *Endrosis sarcitrella* L.; *Elachista rufocinerea* Haw.; *Epinotia tetraquetra* Haw.; *E. subocellana* Don.; *Eucosmomorpha albersana* Hübn., a new record; *Hedyn nubiferana* Haw. (tripunctana F.); *Depressaria purpurea* Haw., a new record; *Swammerdamia heroldella* Hübn.; *Dasycera sulphurella* F.; *Tischeria marginata* Haw., a new record; *Monopis weaverella* Scott., a new record; *M. rusticella* Hübn.; *Hypsopygia* (Pyralis) *costalis* F.; *Acedes ganomella* Treits.; *Tinea parasitella* Hübn.; *T. cloacella* Haw.; *Coleophora leucapennis* Haw. (murinipennella Dup.); *C. sylvaticella* J.H.W., a new record; *Telphusa proximella* Hübn.; *Lampronia oehlmanniella* Treits.; *Phtheocroa maculosana* Haw.; *Eulia ministrana* L.; *Syndemis musculana* Hübn.; *Adela viridella* Scop. The following are a selection of the June captures: *Deilephila elpenor* L.; *Sphinx ligustri* L.; *Stauropus fagi* L.; *Tethea ocularis* L.; *Gastropacha quercifolia* L.; *Oncullia umbratica* L.; *Apamea infesta* Ochs.; *Anathes triangulum* Hufn.; *Apatele megacephala* Schiff.; *Lygephila pastinum* Treits.; *Procus latruncula* Schiff.; *P. strigilis* Clerck; *Apamea monoglyphia* Hufn.; *Thyatira batis* L.; *Pseudoips prasinana* L.; *Malacosoma neustria* L.; *Agrotis exclamationis* L.; *Hoplodrina blanda* Schiff.; *Caradrina morpheus* Hufn.; *Mitochrista miniata* Forst., a new record; *Laspeyria flexula* Schiff., a new record; *Polia nitens* Haw.; *Apatele leporina* L.; *Sterrhia dimidiata* Hufn.; *Perizoma albulata* Schiff.; *Apeira syringaria* L.; *Horisme tersata* Schiff., a new record; *Philereme reticulata* Schiff.; *P. transversata* Hufn.; *Rivula sericealis* Scop.; *Lygris pyraliata* Schiff.; *Hemithea aestivaria* Hübn.; *Comibaena pustulata* Hufn.; *Ligdia adustata* Schiff.; *Plenmyria rubiginata* Schiff. (bicolorata Hufn.); *Hydriomena furcata* Thunb.; *Ortholitha plumbaria* F.; *Aphantopus hyperantus* L.; *Lozopera francillana* F.; a new record; *Batia lunaris* Haw.; *Ethmia decemgutella* Hübn., a new record; *Ebulea* (Psammotis) *crocealis* Hübn., a new record; *Swammerdamia lutarea* Haw.; *Aphomia sociella* L.; *Crambus perlellus* Scop.; *Udea* (Hapalia) *olivalis* Schiff.; *Platyptilia pallidactyla* Haw.; *Salebria* (Phycita) *betulae* Deg.; *Phalonia cnicana* Doubl.; *Cnephasia interjectana* Haw. (virgaureana Treits.); *C. incertana* Treits.; *Isotrias trifasciana* Don.

(*rectifasciana* Haw.); *Argyrotoza bergmanniana* L.; *Pseudargyrotoza conragana* F.; *Notocelia uddmanniana* L.; *N. suffusana* Dup. (*trimaculana* Haw.); *O. lacunana* Schiff.; *Sciaphila branderiana* L.; *Celypha* (*Argyroproce*) *striana* Schiff., forma typica, and f. *purpurana* Haw.; *Apotomis turbidana* Hübn. (*corticana* Hübn. nec Schiff.); *Orthetaenia undulana* Schiff. (*variegana* Hübn.); *Heyda ochroleucana* Frol.; *Apotomis pruniana* Hübn.; *Laspeyresia pomonella* L.; *Lathronympha strigana* F. (*hypericana* Hübn.); *Prays curtisellus* Don.; *Coleophora anatipenella* Hübn., a new record; *Telphusa fugitivella* Zell.; *Ypsolophus alpellus* Schiff., a new record; *Phthorimaea costella* Westw.; *Eucosma fulvana* Steph.; *E. expallidana* Haw.; *E. cana* Haw.; *Epinotia trimaculana* Don.; *Ancylys achatana* F.; *Stomopteryx vorticella* Scop.; a new record; *Perinephela lancealis* Schiff.; *Sitochroa* (*Loxostege*) *verticalis* Hübn.; *Cacoecia crataegana* Hübn.; *C. rosana* L.; *Mniophaga terella* Hübn.; *Amelia paleana* Hübn.; *Lozotaenia forsterana* F.; *Aleimma loeflingiana* L.; *Endothenia gentianana* Hübn.; *E. nigrocostana* Haw., a new record; *Dichrorampha plumbagana* Treits. July species shown were as follows: *Geometra* (*Hipparchus*) *papilionaria* L.; *Cleora rhomboidaria* Schiff.; *Perizoma bifaciata* Haw., a new record; *Xanthorhoë spadicearia* Schiff.; *X. quadrifasciata* Clerck; *X. ferrugata* Clerck; *Sterrhia straminata* Borkh. (*inornata* Haw.); *Crocallis elinguaris* L.; *Deuteronomus alniaria* L.; *Apatele leporina* L.; *Mormo maura* L.; *Eilema griseola* Hübn., typical examples and ab. *flava* Haw., a new record; *E. lurideola* Zinck; *E. complana* L.; *Pterostoma palpina* Clerck; *Drepana binaria* Hufn.; *Euschesis* (*Triphaena*) *comes* Hübn., one dark form and another very red; *Procus furuncula* Schiff.; *Lampra fimbriata* Schreb.; *Apamea secalis* L.; *Bombycia viminalis* F.; *Zenobia subtusa* Schiff.; *Cerapteryx graminis* L.; *Phragmatobia fuliginosa* L.; *Cosmia trapezina* L.; *C. affinis* L.; *Euxoa nigricans* L.; *Thalpophila matura* Hufn.; *Hydraecia oculatea* L.; *Agrotis clavis* Hufn.; *Leucania lythargyria* Esp.; *Amathes baja* Schiff.; *Cilix glaucata* Scop.; *Pyrausta cespitalis* Schiff.; *Swammerdamia caesiella* Hübn.; *Haritalia* (*Notarcha*) *ruralis* Scop.; *Batodes angustiorana* Haw.; *Aristotelia atrella* Haw.; *Batrachedra praeangusta* Haw.; *Brachmia gerronella* Zell., a new record; *Archips* (*Cacoecia*) *xylosteana* L.; *Epinotia* (*Eucosma*) *solandriana* L.; *E. brunnichana* L.; *Eucosma hohenwarthiana* Schiff.; (*scopoliana* Haw.); *E. campoliana* Schiff. (*nigromaculana* Haw.), a new record; *E. cana* Haw.; *Phycita spissicella* F.; *Phalonia smeathmanniana* F.; *P. badiana* Hübn.; *Ypsolophus* (*Cerostoma*) *nemorellus* L.; *Y. parenthesellus* L. (*costella* F.); *Y. vitellus* L.; *Y. xylostellus* L.; *Anacamptis betulina* Vari., a new record; *A. populella* Clerck; *Hyponomeuta padella* L.; *H. evonymella* L., a new record; *Euzophora pinguis* Haw.; *Platyptilia gonodactyla* Schiff.; *Cataclysta lemnata* L.; *Udea* (*Hapalia*) *lutealis* Hübn.; *H. prunalis* Schiff.; *Euxanthus zoegana* L.; *E. hamana* L.; *Tinea arcella* F.; *Mompha conturbatella* Hübn.; *Pandemis corylana* F.; *P. heparana* Schiff. & Denis; *Tortrix forskåleana* L.; *Spilonota ocellana* Schiff.; *Notocelia aquana* Hübn. (*roborana* Treits.); *Hedya salicella* L.;

Aristotelia atrella Haw., a new record; *Depressaria subpropinquella* Staint.; *D. applana* F.; *Homocosoma binaevella* Hübn.; *Agriphila* (*Crambus*) *tristella* Schiff.; *A. (C.) culmella* L.; *Catophria* (*Crambus*) *pinella* L.; *Maniola tithonus* L.; *Gonepteryx rhamni* L. The selection of August species are as follows: *Coenonympha pamphilus* L.; *Diarsia rubi* View.; *Amathes sexstrigata* Haw.; *A. xanthographa* Schiff.; *A. c-nigrum* L.; *Cosmia pyralina* Schiff., a new record; *C. diffinis* L.; *Apamea monoglypha* Hufn.; *Mamestra brassicae* L.; *Scoliopteryx libatrix* L.; *Amphipyra pyramidea* L.; *A. tragopoginis* Clerck; *Euprocitis similis* Fuesl.; *Harpyia furcula* Clerck, second brood; *Notodonta dromedarius* L.; *Luperina testacea* Schiff.; *Euschesis* (*Triphaena*) *interjecta* Hübn.; *Abrostola* (*Unca*) *triplasia* L. (*tripartita* Hufn.); *Trichiura crataegi* L.; *Paradrina* (*Caradrina*) *clavipalpis* Scop.; *Catocala nupta* L.; *Epione repandaria* Hufn.; *Horisme vitalbata* Schiff., a new record; *Anaitis plagiata* L.; *A. efformata* Guen., a new record; *Acasis viretata* Hübn., second brood; *Cosymbia punctaria* L., second brood; *Plusia festucae* L.; *Zeuzera pyrina* L.; *Eurhodope* (*Euzophera*) *advenella* Zinck.; *E. suavella* Zinck., a new record; *Gypsonoma* (*Notocelia*) *dealbana* Fröl. (*incarnatana* Hübn.); *Lathronympha strigana* F. (*hypericana* Hübn.); *Zeiraphera* (*Eucosma*) *insertana* F. (*corticana* Hübn.); *Epinotia paykulliana* F. (*ramella* H.-S.); *E. solandriana* L. f. *sylvana* Hübn. and f. *parmatana* Hübn.; *E. stroemiana* F. (*similana* Hübn. nec Schiff.); *E. nisella* Clerck; *Ypsolophus scabrellus* L.; *Acedes ganomella* Treits (*lapella* Hübn.); *Apotomis* (*Argyroplote*) *betuletana* Haw.; *Celypha* (*Argyroplote*) *striana* Schiff. f. *purpurana* Haw.; *Eudemis* (*Argyroplote*) *profundana* Schiff., a new record; *Pandemis heperana* Schiff & Denis; *P. corylana* F.; *Anthophila* (*Simaethis*) *fabriciana* L.; *Epitheatia mouffetella* Schiff.; *Acentropus niveus* Ol.; *Notarcha ruralis* Scop.; *Mesographe forficalis* L.; *Monopis weaverella* Scott, probably second brood; *Endothenia antiquana* Hübn., a new record; *Depressaria heracliata* L.; *D. hypericella* Hübn., a new record; *D. douglasella* Staint., a new record; *Laspeyresia splendana* Hübn.; *Pyrausta* (*Rhodaria*) *purpuralis* L.; *Argyrotoza latifasciana* Haw.; *Acleris variegana* Schiff. & Denis; *Borkhausenia unitella* Hübn., a new record; *Endrosis sarcitrella* L. (*lactella* Schiff.). The following are a selection from the September records: *Aporophyla lutulenta* Schiff.; *Tiliacea citrigo* L.; *T. aurago* Schiff., and one ab. *fuscata* Esp.; *Citria lutea* Stroem; *Cirrhia gilvago* Schiff.; *C. icteritia* Hufn. ab. *flavescens* Esp.; *Atethmia xerampelina* Esp.; *Allophyes oxyacanthae* L., and ab. *capucina* Mill.; *Nycteola* (*Sarrothripus*) *revayana* Scop.; *Agrochola lychnidis* Schiff., several forms; *A. lota* Clerck.; *A. circellaris* Hufn., a dwarf example; *Omphaloscelis lunosa* Haw., an ab. *agrotoides* Guen., and another with dark hindwings also; *Dryobotodes eremita* F. (*protea* Schiff.); *Anchocelis litura* L.; *Agrotis segetum* Schiff.; *A. puta* Hübn., a rather dark example; *Gortyna flavago* Schiff.; *Lithophane semibrunnea* Haw.; *Arenostola pygmina* Haw.; *Tholera popularis* F.; *Conistra ligula* Esp.; *Hypena proboscidalis* L., second brood; *Dysstroma truncata* Hufn.; *Sterrhia seriata* Schrank.; *Nycterosia obstipata* F.,

Scopula imitaria Hübn., second brood; *Deuteronomos fuscantaria* Steph.; *Archips (Cacoccia) oporana* L. (*podana* Scop.); *Eucosma expallidana* Haw.; *Olethreutes (Argyroplote) lacunana* Schiff.; *Ypsolophus (Cerostoma) parenthesesellus* L. (*costella* F.); *Hapalia (Phlyctaenia) ferrugalis* Hübn.; *Nomophila noctuella* Schiff.; *Emmelina (Pterophorus) monodactylus* L.; *Acleris (Peronea) sparsana* Schiff. & Denis; *Depressaria arenella* Schiff.; *D. alstroemeriana* Clerck; *Phthorimaea costella* Westw.; *Epinotia (Eucosma) tenerana* Schiff. (*penkleriana* F.R.). The following were captured in October and November; *Episema caeruleocephala* L.; *Anchocelis helvola* L.; *Agrochola macilentana* Hübn.; *Oporinia dilutata* Schiff.; *Operophtera brumata* L.; *Epinotia (Eucosma) maculana* F. (*ophthalmicana* Hübn.); *Acleris (Peronea) rhombana* Schiff. & Denis (*contaminana* Hübn.); *A. boscana* F.; *Carcina quercana* F.

Mr. J. H. PAYNE—A female *Maniola jurtina* L. ab. *caeca* Rebel, Northamptonshire and a female aberration of *Pieris brassicae* L., bred, Northamptonshire.

Mr. E. C. PELHAM CLINTON—British Lepidoptera taken or bred during 1959-60; *Myrmecozela ochraceella* Tengst., Braemar, Aber., 9.vii.60; *Argyresthia glaucinella* Zell., Lyndhurst, Hants, 24.vi.60; *Zelleria saxifragae* Staint., Braemar, 10.vii.60, and bred from pupae collected on the same date; *Ethmia bipunctella* F., Lydd, Kent, June 1960; *E. terminella* Fletcher, Lydd, June 1960; *Hyponomeuta irrorella* Hübn., Old Alresford, Hants, 24.vi.60; *Blastodacna (Mompha) stephensi* Staint., Richmond, Surrey, 3.vii.60; *Dichomeris juniperella* L., Braemar, 9.vii.60; *Stomopteryx sangiella* Staint., Scremerston, Northumb., 4.vii.59; *Pseudeucosma caecimaculana* Hübn., Portland, Dorset, June 1960; *Euxanthia alternana* Steph., Folkestone, Kent, 27.vi.60; *Aegeria muscaeformis* Esp., Lizard, Cornwall, June 1960; *Pyrausta perlucidalis* Hübn., Wood Walton Fen, Hunts., 12.vi.60; *Perinephela (Pyrausta) verbascalis* Schiff., Folkestone, Kent, and East Hoathly, Sussex, June 1960; *Dioryctria (Epischnia) banksiella* Rich., Portland, 18.vi.60; *Zygaena trifolii* Esp., ab. *lutescens* Cockerell, Heytesbury, Wilts., 18.vi.60; *Tethea fluctuosa* Hübn., specimens from Scotland (Bunarkaig, Inv., 4.vi.60) for comparison with a series from the south of England (Balcombe, Sussex, and Hindhead, Surrey, June 1960); *Malacosoma castrensis* L., Faversham, Kent, bred from larvae collected in June 1960; *Harpyia (Cerura) bispus* Borkh., Balcombe, 16.vi.60; *Eupithecia pini* Retz., Scremerston, 4.vii.59; *Sterrhia degeneraria* Hübn., Portland, 18.vi.60; *S. ochrata* Scop., Deal, Kent, 29.vi.60; *Hoplodrina (Caradrina) blanda* Schiff., (*taraxaci* Hübn.)?, melanic aberration, Port Appin, Argyll, 25.vii.59; *Apamea ophiogramma* Esp., Inveresk, Midloth., 12.vii.60; *Agrochola lota* Clerck, Killarney, Kerry, and Skibbereen, Cork, November 1959; *Hadena barrettii* Doubl., Lizard, 20.vi.60.

Mr. S. W. P. POOLES—Aberrations of *Isturgia carbonaria* Clerck (Pl. I, figs. 10 and 12), with a typical example for comparison, Aviemore, Inv., May 1958 and 1960.

Mr. N. B. POTTER—Aberrations of British Lycaenidae including: *Aricia agestis* Schiff., two male undersides, an extreme ab. *radiata* Oberth. and another with similar characteristics to ab. *alba* B. & L. of *Lysandra coridon* Poda; *Lysandra coridon* Poda, male undersides, ab. *transiens* B. & L., ab. *anticaeca* B. & L., and female underside ab. *nigricans* B. & L. + *nubila* B. & L.; *Lysandra bellargus* Rott., male undersides, one exhibiting ab. *alboradiata* B. & L. characteristics of *Lysandra coridon* Poda, another showing ab. *postradiata* B. & L. characteristics of the same species, and the third with ab. *transradiata* Courv. characteristics also of *L. coridon* Poda.

Mr. AUSTIN RICHARDSON—Lepidoptera taken or bred during 1960; (1) series of *Arenostola morrisii* Dale, Dorset; *A. extrema* Hübn., Hunts.; *A. fluxa* Hübn. Oxon.; *Orthosia incerta* Hufn., a varied series, Rannoch, Inv.; *Achlya flavicornis* L., including heavily banded and violet forms, Rannoch; *Brachionycha nubeculosa* Esp., the dark form from Rannoch, with a lighter series for comparison from Aviemore, Inv.; *Perizoma (Coenoteophria) sagittata* F., bred from Cambs., Hunts. and Norfolk, with four blown larvae; *Amathes depuncta* L., Aviemore; *Dysstroma concinnata* Steph., two generations bred from Arran stock on strawberry, with two blown larvae. *Euschesis (Triphaena) sobrina* Boisd., Aviemore and Ross, and *Diarsia rubi* View., dark and banded aberrations from Mr. A. V. Hedges' trap, Isle of Man. (2) *Atethmia xerampelina* Esp., one reddish aberration, from the Isle of Man; *Chaonia (Drymonia) ruficornis* Hufn., suffused aberration, Glos.; *Luperina testacea* Schiff., banded aberration, Scilly; three *Agrotis exclamationis* L., two of which were ab. *plaga* Steph., Glos.; *Apamea remissa* Hübn. (*obscura* Haw.), extreme form, one Hunts., one Glos.; two *Zygaena lonicerae* von Scheven, one red, one ab. *citrina* Speyer, both confluent, Glos.; *Lampropteryx oregiata* Mete., Glos., second county specimen; two *Eupithecia phoeniceata* Ramb., Cornwall, second and third British specimens; *Pyrausta perlucidalis* Hübn., Hunts.; *Palpita unionalis* Hübn., Mon., *Anthocharis (Euchloë) cardamines* L., aberration with very heavily marked tips to forewings, Wores.

Mr. DONALD ROWBERRY—The following Lepidoptera: *Pieris brassicae* L., four males including a dwarf, each with creamy-yellow ground colour and purplish-brown apical markings, seeming to approach ab. *flava* Krul; all four were taken on lucerne at Dover, Kent, 9.viii.59; a typical male was shown for comparison. *P. rapae* L., a female with clearly defined discoidal spots on both hindwings, taken in a lucerne field at Lympne, Kent, 14.ix.59. *P. napi* L., an extremely fine large male taken in Alice Holt Forest, Hants, 11.vii.60, and a dwarf female taken at Ranmore, Surrey, 5.viii.60. *Anthocharis (Euchloë) cardamines* L., a small male, very pale and partially transparent, and another small male with yellow suffusion on right forewing, both taken at Chiddingfold, Surrey, 24.iv.60. *Colias croceus* Fourc., a male aberration taken on lucerne at Lympne, Kent, 14.ix.59; the upperside has

irregular, wedge-shaped white marks on both forewings and irregular silver patches on hindwings with silver discoidal spots, the underside has irregular white patches on three wings; a typical male was shown for comparison. *Papilio machaon* L., a male approaching ab. *obscura* Frohawk, and a female with slight tendency towards ab. *obscura* Frohawk on forewing tips; both emerged from purchased pupae, June 1960. *Gonepteryx rhamni* L., a gynandromorphous male with streaks of female colouring on left forewing, taken at Wanborough, Surrey, 23.viii.59. *Pararge aegeria* L., a male with generally dark markings and suffused hindwings, Plaistow, Sussex, 29.v.60; a female ab. *quadriocellata* Meves., Woking, Surrey, 28.v.60; and a female with characters approaching the ab. *xanthos* Frohawk of *Pararge megera* L., Woking, 28.v.60. *Maniola jurtina* L., a male with bleaching on both hindwings, Woking, 26.vi.60, and a very pale female, Henley-on-Thames, 9.vii.60. *Aphantopus hyperantus* L., a male with bleached right hindwing, Wanborough, 17.vii.59. *Coenonympha pamphilus* L., an example of homoeosis with pronounced streak of forewing colouring on underside right hindwing, Ranmore, 20.viii.60. *Polyommatus icarus* Rott., ab. *iphis* Meig., Folkestone, Kent, 12.viii.59; three ab. *caerulea* Fuchs, Beckley, Oxon., 4.vi.60, and Ranmore, 27.viii.60; ab. *icarinus* Scharf., female, Folkestone, 31.viii.60. *Lysandra coridon* Poda, ab. *fouleri* South, Ranmore, 5.viii.60; ab. *marginata* Tutt, Ranmore, 5.viii.60; ab. *arcuata* Courv., male, Dover, 12.viii.59, and a female, Ranmore, 27.viii.60; also a dingy male with overall ground colour a very dull greyish-mauve and with marginal markings light brown, Dover, 12.viii.59. *Lysandra bellargus* Rott., ab. *arcuata* Courv., female, Ranmore, 4.ix.59, and a female with underside and upperside ground colour a much paler brown than usual. *Mimas tiliae* L., a one-spot aberration of the deep, brick-red form, bred from pupa found at Woking, emerged 23.vi.60. *Laotaoë populi* L., three interesting forms taken at mercury vapour light at Woking, May, June and July 1960; a dwarf male with maximum wingspan 54 mm., an asymmetrical male; and a male with an unusual bronze ground colour. *Parascotia fuliginaria* L., one of three examples taken at mercury vapour light in a garden at Woking during the third week of August 1960. *Arctia caja* L., a male aberration with both brown forewing markings and blue hindwing markings greatly enlarged, at mercury vapour light, Woking, 26.vii.60.

Mr. A. D. A. RUSSWURM—Some variation in butterflies and moths taken during the summer of 1960. *Pararge aegeria* L., a male with cream spots nearly obsolete, and one female with markings normal but heavily suffused, New Forest, Hants, July; *P. megera* L., a female with angled forewings, distorted apical spot, and markings on hindwings partly obscured by suffusion, Hod Hill, Dorset, June; *Maniola jurtina* L., a male underside with complete absence of orange colouring, ground colour lilac-grey, forewings with orange area replaced by greyish-white, New Forest, July; *M. tithonus* L., a female with light straw-coloured ground colour, a female ab. *anticrassipuncta* Leeds, four very dark males, one of which has orange-fulvous area in hindwings obsolete, the

three others approaching this form, two male undersides with additional spots below the sub-apical spot, New Forest, July; *Argynnis paphia* L., two males with outer spots enlarged and joined, New Forest; *Nymphalis io* L. ab. *exoculata* Weym., bred from web of young larvae taken at Brockenhurst, Hants, and which emerged 3rd August, the remainder of the brood were typical and were released; *Vanessa atalanta* L., a male with red markings reduced and broken in centre of forewing, black spots on band in hindwing greatly enlarged, and another with these spots absent, Brockenhurst, September; *Aglais urticae* L., two dark forms, one upperside with nervures on forewings covered with black scales, and one underside heavily suffused, bred, Hod Hill; *Euphydryas aurinia* Rott., two females bred from Hod Hill, including one fasciated aberration; *Plebejus argus* L., a female underside with ground colour silver-grey similar to male, lemon-yellow lunules and hindwings, ab. *basijuncta* Tutt, six female undersides with striated hindwings, from a colony in the New Forest, July; *Diacrisia sannio* L., a female with black hindwings and four males including one albino, New Forest, July.

Air-Marshall Sir ROBERT SAUNDBY—Lepidoptera taken in the wild in the Newbury District. *Vanessa atalanta* L., a specimen in which the usual red markings are replaced by brown; *Aglais urticae* L., with the yellow markings almost obsolete; *Lycaena phlaeas* L. ab. *schmidtii* Gerh.; a fine *Herse convolvuli* L. male in excellent condition, taken at light; two examples of *Arctia caja* L., one with plain cream coloured forewings, the hindwings suffused with yellow, and the black spots reduced to three (Pl. I, fig. I), the other with very heavy dark markings on both forewings and hindwings; a male *Macrothylacia rubi* L. ab. *fasciata* Tutt, bred from a larva found after hibernation; a male *Mitochondria miniata* Forst. ab. *crocea* Bign. (*flava* Meyer); one *Cosymbia pupillaria* Hübn., taken at light 13.x.59.

Miss C. SCHELWALD—see Mr. F. G. Smith.

Col. E. SCOTT—(1) A female *Uresiphita polygonalis* Hübn. (*gilvata* F.), taken in good condition by Mr. C. A. W. Duffield at Brook, Kent, 14.ix.60, at mercury vapour light; *Cryphia muralis* Forst., Ashford, Kent, a rare moth away from the coast. (2) A selection of micro-lepidoptera taken or bred during the past season.

Mr. L. W. SIGGS—Lepidoptera taken at mercury vapour light in the New Forest, Hants, at Minstead, 1958-60: *Notodonta dromedarius* L., a male aberration with forewings reddish brown and with a dark brown cloud in centre of wing and on outer edge, 12.v.59; *Odontesia carmelita* Esp., 26.iv.59; *Dasychira fascelina* L., 20.vii.60; *Macrothylacia rubi* L., a pretty brown female aberration, 27.vi.60; *Nola strigula* Schiff., 27.vi.60; two examples of *Nola albula* Schiff., 15 and 18.vii.58; *Lithosia quadra* L., male with forewings wholly grey except for the basal yellow patch, 20.vii.60; two specimens of *Eilema griseola* Hübn. ab. *flava* Haw., 4 and 10.vii.59; *Polia nebulosa* Hufn., two pale specimens (? ab. *pallida* Tutt), 10 and 30.vi.59; two specimens of *Hadena contigua* Schiff., 19.vii.58 and 5.vi.60; *Apamea scolopacina*

Esp., 24.vii.60; *Arenostola phragmitidis* Hübn., 16.vii.59; *Leucania obsoleta* Hübn., 27.vi.60; *Meristis trigrammica* Hufn., melanic aberration, 5.vi.60; *Orthosia advena* Schiff., 3.v.60; *Anchoscelis helvola* L., two examples of a pretty brownish red and olive-green aberration, 24.ix.60; *Dasycampa rubiginea* Schiff., 5.v.59; *Eustrotia uncula* Clerck, 5.vii.59; *Catocala promissa* Schiff., 9.vii.59; *Oporinia dilutata* Schiff., ab. *latefasciata* Prout, 1.ix.59; *Bapta distinctata* H.-S., 5.vi.60; *Erannis defoliaria* Clerck ab. *obscurata* Staud., 10.ix.60; *Pachynemia hippocastanaria* Hübn., an aberration with well defined cross lines enclosing darker central area, 20.vii.60; two specimens of *Cleora cinetaria* Schiff., 13.v.59 and 2.v.60; *Alcis* (*Cleora*) *repandata* L. ab. *nigricata* Fuchs., 24.vi.60; *A.* (*C.*) *jubata* Thunb., 20.vii.58; *Ectropis biundularia* Borkh. (*bistortata* Goeze auct nec Goeze), melanic aberration, 2.iv.59; *Palpita unionalis* Hübn., female, 18.x.60, male, 19.x.60.

MR. BERNARD F. SKINNER—Lepidoptera from various localities. Aviemore, Inv.: *Heliothis scutosa* Schiff., *Diarsia dahlii* Hübn., *Apamea furva* Schiff., s.sp. *britannica* Cockayne, *A. assimilis* Doubl., *Enargia paleacea* Esp., *Plusia interrogationis* L., *Amathes depuncta* L., *Euschesis* (*Triphaena*) *sobrina* Boisd., *Eurois occulata* L., *Coenonympha tullia* Müll., and *Erebia aethiops* Esp. Wood Walton Fen, Hunts.: *Arenostola extrema* Hübn. Wicken Fen, Cambs.; *Meliana flammea* Curt., *Chilodes maritima* Tausch. and *Leucania obsoleta* Hübn. The Breck district, Suffolk: *Anepia irregularis* Hufn., *Hadena compta* Schiff., *Agrotis vestigialis* Hufn. N. Hants: *Plusia chryson* Esp. Tilgate, Sussex: *Tethea fluctuosa* Hübn., *Harpyia* (*Cerura*) *bicuspis* Borkh., and *Hyloicus pinastri* L. Surrey: series of *Apatura iris* L. and *Odontesia carmelita* Esp. Middlesex: a series of *Xanthorhoe birivata* Borkh. Camber, Sussex: *Eumichtis lichenea* Hübn. Eastbourne, Sussex: a series of *Lithophane leautieri* Boisd. Charmouth, Dorset: *Leucania vitellina* Hübn. S.W. Kent: *Hydraecia chucherardi* Mab. and *Dasychira fascelina* L.

MR. F. G. SMITH and Miss C. SCHELWALD on behalf of the Rothamsted Experimental Station—Material collected from brooks of shallow, almost stagnant, water intersecting fields at Lewes Levels, Sussex, 22.x.60. The brooks contained various aquatic plants such as: *Lemna minor* L. (Duckweed), *L. trisulca* L. (Ivy Duckweed), *Ceratophyllum demersum* L. (Hornwort), *Elodea canadensis* Michx. (Canadian Pondweed), *Hydrocharis morsus-ranae* L. (Frogbit), and *Azolla filiculoides* Lam. (Fairy Fern). Living animals of various Classes were shown including *Dendrocoelum lacteum* (Müller), *Polycelis nigra* (Müller) and *Dugesia lugubris* (O. Schmidt) (Turbellaria); *Piscicola geometra* L. (leech) (Hirudinea); *Asellus meridianus* Recovitz (Water Slater) (Crustacea); Acarina (water mites), *Argyroneta aquatica* (Clerck) (Water Spider) and *Pirata piraticus* (Clerck) (Surface Water Spider), (Arachnida); *Pygosteus pungitius* (L.) (Ten-spined Stickleback) and a three to four-year-old elver *Anguilla vulgaris* Day (Pisces); and water snails

of the genera *Bithynia*, *Limnaea* and *Planorbis* (Mollusca). Live insects shown were: may fly nymph *Cloëon simile* Eaton (Ephemeroptera); water beetles of the genera *Hydrophilus*, *Helophorus* and *Graptodytes*; and the Lesser Water Boatman, *Corixa* (*Hesperocorixa*) *linnei* (Fieber) (Hemiptera). The following mounted insects were included in the exhibit: *Dytiscus semisulcatus* Müll., *D. marginalis* L., *D. circumflexus* L. *D. lapponicus* Gyll., *D. circumcinctus* Ahr., *D. dimidiatus* Bergstr. and *Hydrophilus rufifrons* (Müll) (*piceus* L.) (Coleoptera); *Notonecta glauca* L., *N. maculata* F. and *Corixa* (*Hesperocorixa*) *linnei* (Fieb.) (Hemiptera).

Mr. W. H. SPREADBURY—An example of the scarce immigrant *Utetheisa pulchella* L., taken at Seaford, Sussex, 15.v.60.

Mr. R. E. STOCKLEY, Mr. I. R. P. HESLOP and Mr. G. R. HYDE—A selection of photographs of *Apatura iris* L., taken by Mr. Hyde, together with some excerpts from their monograph "Notes and Views of the Purple Emperor".

Miss VERE TEMPLE—(1) Watercolours: *Myrica gale* L. (Bog Myrtle); *Bupalus piniaria* L. (Lep.) larvae on the foodplant; *Quercus* (*Thecla*) *quercus* L. (Lep.) larva on *Quercus robur* L. (*pedunculata* Ehrh.); *Limnophilus rhombicus* (L.) (Trich.) imago, larvae and cases; *Pyrrhosoma nymphula* (Sulz.) (Od.) nymphs and imagines; *Coenagrion puellum* (L.) (Od.) imago emerging from pupal case and nymph; *Aeshna cyanea* (Müll.) (Od.) imago and nymphs. (2) An example of *Gilpinia hereyniae* (Hartig) (Hym., Symphyta) female bred from larva taken in Farnham Wood, Dorset, October 1959. The fly emerged in May 1960. Also a water colour of the larva on its foodplant.

Rear-Admiral A. D. TORLESSE—Lepidoptera taken on the Island of Mull, Argyllshire, between 9 and 30.vi.60: *Eumenis* (*Satyrus*) *semele* L., four males with three from the New Forest, Hants, for comparison; *Coenonympha tullia* Müll., a short series of s.sp. *scotica* Staud.; *Polyommatus icarus* Rott.; *Harpyia* (*Cerura*) *furcula* L.; *Spilosoma lubricipeda* L.; *Diacrisia sannio* L.; *Apatele leporina* L.; *A. menyanthidis* View.; *Amathes ditrapezium* Schiff.; *Polia nebulosa* Hufn.; *Anaplectoides prasina* Schiff.; *Hadena bombycina* Hufn. (*glauca* Hübn.); *Apamea oblonga* Haw. (*abjecta* Hübn.); *Eustrotia uncula* Clerck; *Plusia bractea* Schiff.; *P. festucae* L.; *Perizoma blandiata* Schiff.; *Eupithecia subumbra* Schiff. (*scabiosata* Borkh.); *Dyscia fagaria* Thunb.; *Crambus ericellus* Hübn.; *Catophria* (*Crambus*) *furcatella* Zett., taken at 2,500 to 3,100 feet; *Udea* (*Pyrausta*) *alpinalis* Schiff. s.sp. *uliginosalis* Steph., taken at 1,500 feet; *U. (P.) decrepitalis* H.-S.; *Zygaena loti* Schiff. (*achilleae* Esp.); *Z. purpuralis* Brün.; *Hepialus fusconebulosa* Deg.

Mr. M. W. F. TWEEDIE—A pen drawing of moths at a sugared fence-post, Camber, Sussex, July 1959. Species depicted are: *Noctua* (*Triphaena*) *pronuba* L., *Thalophila matura* Hufn., *Leucania impura* Hübn., *Diataraxia oleracea* L. and *Amathes c-nigrum* L.

Mr. M. W. F. TWEEDIE & Mr. L. CHRISTIE—Seven male and two female *Aricia agestis* Schiff. of the race *artaxerxes* F. (Lep., Lycaenidae) taken in Sutherland, 18.vii.60, by the exhibitors.

Mr. D. H. WALKER—A female *Lycaena phlaeas* L. ab. *radiata* Tutt, Surrey, 3.viii.60: two males and a female *Eumenis (Satyrus) semele* Schiff., of the dwarf race *thyone* Thompson, Great Orme's Head, N. Wales, 23.vii.60. The males of the latter measure 39 mm. across the wing, the female 47 mm., against the normal wingspan of 48 mm. and 52 mm. respectively. One male shows very heavy white banding on the underside hindwings.

Mr. S. WAKELY—Lepidoptera taken or bred during 1960, including: *Simyra venosa* Borkh. (*albovenosa* Goeze auct. nec Goeze), *Euxoa cursoria* Hufn., *Apamea oblonga* Haw., *Celaena leucostigma* Hübn., *Eremobia ochroleuca* Schiff., *Nonagria neurica* Hübn., *Arenostola elymi* Treits., *Plusia festucae* L., *Schoenobius gigantellus* Schiff., *Evergestis extimalis* Scop., *Epischnia (Phycita) boisduvaliella* Guen., *Nyctegretis achatinella* Hübn., *Agriphila (Crambus) selasella* Hübn., *Phalonia atricapitana* Steph., *Eucosma maritima* Westw., *Brachmia gerroneila* Zell., all from Southwold, Suffolk; *Calophasia lunula* Hufn., Dungeness, Kent; *Nonagria sparganii* Esp., Chattenden, Kent; *Lithophane leautieri* Boisd., bred from larva found on cypress in the Isle of Wight (see also pp. 10 and 13); *Hapalotis venustula* Hübn., Bookham, Surrey; *Colobochyla salicalis* Schiff., Ham Street, Kent; *Aplasta ononaria* Fuessl. and *Sterrrha ochrata* Scop., Sandwich, Kent; *Crambus dumetellus* Hübn., Princes Risborough, Bucks; *Calamotropha (Crambus) paludella* Hübn., Higham, Kent; *Oxyptilus distans* Zell., Thorpness, Suffolk; *Grapholita molesta* Busck., bred from a peach; *G. gemmiferana* Treits., Luccombe, Isle of Wight; *Selania leplastriana* Curt., Folkestone, Kent; *Hypercallia christiannana* L., Wrotham, Kent; *Depressaria pallorella* Zell., Studland, Dorset; *Hyponomeuta irrorella* Hübn., High Halstow, Kent; *Ethmia funerella* F., Chartham, Kent; *E. bipunctella* Dungeness, Kent; *Caloptilia pyrenaecella* Chrét., Isle of Wight; *Gracillaria cuculipennella* Hübn., Horsley, Surrey. *G. populetorum* Zell., Ockham, Surrey; *Teichobia verhuellella* Staint., Westwell, Kent; *T. filicivora* Meyr., Bournemouth, Hants.

Mr. NORMAN A. WATKINS—Three series of *Melanargia galathea* L. aberrations. (1) A series taken in Somerset and Gloucestershire during 1960 including a male and female trans. ab. *valentini* Williams, Glos. and Somerset; males and a female ab. *valentini* Williams, Somerset, two of which are the very extreme form and one being the most extreme form that has yet come to the notice of the exhibitor, with only one very small patch of white scales remaining on the affected part of each forewing. (2) A series of males from Gloucestershire including: an example with typical forewings, but with the left hindwing with white background and enlarged marginal lunules and all the usual black scaling grey and reduced in size, and the right hindwing with suffused margin and greatly reduced lunules; a dark male with additional

scales below central black patch on forewings (similar females were also shown); an example with apical markings on forewings reduced, giving a rayed effect; two dark males with forewing marginal white spots partially obliterated; an example with all black markings replaced by brown; an example with asymmetrical hindwings, the right with bleached margin similar to the aberration *margotransformis* Leeds of *Maniola jurtina* L.; an example having forewings with suffused dark grey marginal markings, hindwings with all black replaced by grey and reduced, and with greatly enlarged white marginal lunules; a trans. ab. *valentini* Williams with asymmetrical hindwings, the left hindwing having suffused black marginal markings, the right hindwing being typical; a teratological aberration with left forewing having rayed marginal spots. (3) Female aberrations from Gloucestershire: a teratological example with forewings nearly devoid of scales; an underside example having hindwings with reduced dark marginal spots and pale and enlarged marginal chevrons; another underside having forewings with black markings reduced and replaced by grey, right hindwing with reduced markings, left hindwing similar but with continuous grey-brown border outside lunules; two contrasting forms with rayed apical markings to forewings; two examples similar to the second item in (2) above; trans. ab. *nigricans* Culot, another female was taken from which eggs have been obtained—it is hoped to discover the genetics of this aberration by further breeding; an example with rayed apical markings to forewings and asymmetrical hindwings, right hindwing lightly marked within typical range, left hindwing with suffused marginal chevrons and two sub-marginal black spots radiated. (4) Four aberrations of *Aricia agestis* Schiff.: a male from Wilts., 27.viii.60, ab. *radiata* Oberth. and showing "postalba" characteristics as used by Leeds (1949, *Proc. S. Lond. ent. nat. Hist. Soc.* **1948-49**: 80-122); a male with large orange coloured spots to all wings, Wilts., May, 1960; a male underside approaching ab. *salmacis* Steph., Wilts., August, 1960; and a large female with greatly enlarged red spots to all wings, Glos., September 1960.

Mrs. N. I. WATSON—*Maniola tithonus* L.: a series of very dark forms with orange-fulvous area on hindwings greatly reduced in both sexes; one male with bleached forewing; two male ab. *pallidula* Leeds; one male ab. *antiparvipuncta* Leeds + *postobsoletissima* Leeds: a series of male ab. *excessa* Leeds; and one female with light cream areas in ground colour. *Maniola jurtina* L.: a series of males and females partly bleached; two female undersides with enlarged apical spot; a series of females with orange area varying through shades of cream and buff to white. *Aphantopus hyperantus* L.: five uppersides with rings prominent on all wings, one of which is asymmetrical; two males with "postcaeca" characteristics; one male with bleached left forewing, one male with increase of yellow in rings; one asymmetrical male with pale patches which is also ab. *lanceolata* Shipp; four males approaching ab. *lanceolata* Shipp, and

a series of ab. *crassipuncta* Burkhardt. *Argynnis paphia* L., two females with enlarged spotting, one having partly bleached hindwing. *Euphydryas aurinia* Rott.: a bred series showing various characteristic forms including one male with albinistic patches; a uniform red male; an extreme fasciated male; one male with markings obsolete on cream ground colour and almost black hindwings; and one pale female. *Aglais urticae* L.: six specimens illustrating colour forms; one female with pale ground colour and extended blue lunules on hindwings; one male with central spots missing on right forewing; one female ab. *polaris* Staud.; one female with left forewing bleached; and two large female colour forms. *Plebejus argus* L.: a series of male and female undersides including enlarged spotting on some of the males; one ab. *basijuncta* Tutt and another with "partimtransformis" characteristics; one female underside extremely striated on all wings; one male upper-side with "partimtransformis" characteristics; and a male upperside with black border extended. *Polyommatus icarus* Rott.: series of male and female underside colour forms; male upperside with "partimtransformis" characteristics and with half the right forewing white; females with underside ab. *arcuata* Courv., ab. *melanotoxa* Pincitore-Marott, and with "limbojuncta" characteristics; series of blue female uppersides including one with blue rays on hindwings and another with prominent orange lunules on forewings; and a blue female with black borders divided into wedges. *Lysandra coridon* Poda: series of male colour forms; a female with yellow lunules on all wings; male and female underside ab. *i-nigrum* Tutt, ab. *limbojuncta* Courv., ab. *fulvescens* Tutt and ab. *glomerata* Tutt. *Lysandra bellargus* Rott.: series of blue females approaching ab. *ceronus* Esp.; male underside ab. *obsoleta* Tutt; female underside with left hindwing ab. *caeca* B. & L., and greatly reduced in size.

Mr. B. K. WEST—Aberrations of Lepidoptera: (1) *Melanargia galathea* L. ab. *aperta* Rebel, Anglure, Marne, France, 4.vi.60 (Pl. I fig. 6); (2) *Coenyrus hebe* Trim., a specimen with an extra, large ocellated spot, between the normal ones on the forewings, from the Nqueleni valley, Zululand, 15.iv.56. (3) *Euproctis similis* Fuessl., with considerable dark scaling on forewings, Orlestone Woods, Kent, 24.viii.60.

Mr. A. S. WHEELER—The following Lepidoptera: *Pararge aegeria* L., a rather worn male, darker than usual, caught at Headley Heath, Surrey, 14.v.60 (Plate I, fig. 2); *Apatura iris* L., the wreck of a female taken on the Alice Holt Forest, Hants, field meeting in July, the butterfly was in captivity nine days before laying the first of about 80 eggs on sprigs of willow in a cheese tub; *Lycaena phlaeas* L., three specimens bred from a number of females caught near Eastbourne, Sussex, two males with dark hindwings unsuccessfully kept alive as breeding stock, and a female with the left forewing straw-coloured.

Mr. L. S. WHICHER—Fossil Cephalopoda etc., from the middle and upper Lias of Ilminster, Somerset.

Mr. A. J. WIGHTMAN—Long series of *Hadena (Dianthoecia) lepida* Esp., for the most part bred from wild larvae and pupae taken during

the period 1920 to 1949. The exhibit was arranged to show both the general variation and also the way in which this species produces specialised local forms, including form or s.sp. *capsophila* Dup. from England as well as from Ireland and the Isle of Man.

Dr. C. G. M. DE WORMS—(1) A selection of moths taken in the British Isles during 1960. Series of *Stauropus fagi* L., from Kent and Surrey; *Polyplocia ridens* F., dark form from Horsell, Surrey; *Moma alpium* Osbeck, from Ham Street, Kent; *Amathes ditrapezium* Schiff., from East Suffolk; *Agrotis vestigialis* Hufn., from the Breck area on the Norfolk/Suffolk border; *Polia hepatica* Clerck (*tineta* Brahm), from Horsell; *Cerastis rubricosa* Schiff., from Aviemore, Inv.; *Orthosia advena* Schiff., from Cumberland; *Pyrrhia umbra* Hufn., from the Breck area; *Heliothis virescens* Hufn. (*dipsacea* L.), from the Breck area; *Trichopteryx carpinata* Borkh., from Aviemore; *Coenocalpe lapidata* Hübn., from the Rannoch area, Inv.; *Angerona prunaria* L., normal and dark forms from Ham Street; *Ectropis biundularia* Borkh. (*bistortata* Goeze auct. nec Goeze), from Aviemore; *Lycia hirtaria* Clerck, a variable series from Aviemore. (2) Uncommon species and aberrations of British moths taken and bred during 1960: *Acherontia atropos* L., a male and a female taken in a mercury vapour trap at Struan, Perthshire, 17th and 18th September; *Herse convolvuli* L., a male taken at Ham Street, 26th September and a female from Studland, Dorset, 7th October; *Drymonia dodonaea* Schiff. (*trimacula* Esp.), a male with black thorax and melanic wings, Horsell, 16th June; *Asphalia diluta* Schiff., a specimen with melanic wings and with the cross-lines obscured, probably an undescribed form, Chiddingfold area of Surrey, 24th September; *Trichiura crataegi* L., a male f. *ariae* Hübn. from Struan, 16th September; *Cryphia perla* Schiff., a dark form taken at Horsell, 29th July; *Hadena conspersa* Schiff., three examples of the dark form bred from Unst, Shetland; *H. lepida* Esp., a male of the yellow form without markings from Walberswick, Suffolk, 25th July, and a female of the white form with few markings from Dungeness, 30th July; *Cerapteryx graminis* L., a female with very bright band on costa taken at Struan, 16th September; *Apamea sordens* Hufn., a melanic male taken at Horsell, 24th May; *Orthosia gothica* L., a male with the gothic mark almost absent, Horsell, 27th April, and two males of the extreme *gothicina* H.-S. form, Newtonmore, Inv., 24th April; *Xylocampa areola* Esp., a very melanic example, Ham Street, 7th May; *Trichopteryx carpinata* Borkh., two examples of the smoky form, Witherslack, Westmorland, 15th April; *Alsophila aescularia* Schiff., a melanic male, Horsell, 12th March; *Cleora rhomboidaria* Schiff., a melanic example, Horsell, 8th August; *Biston betularia* L., an example of the ab. *insularia* Th.-Meig. form with very pale hindwings, Horsell, 24th May; *Apocheima hispidaria* Schiff., a melanic male, Horsell, 12th March; *Ectropis biundularia* Borkh. (*bistortata* Goeze auct. nec Goeze), a male with cross-lines merged in a sub-marginal band, Horsell, 24th March. (3) A selection of 57 species of butterflies taken in Piedmont,

N. Italy, in June, at Pontresina in Switzerland in July and in the Vienna district of Austria in August.

Mr. L. D. YOUNG—*Lycaena phlaeas* L. aberration, Hertfordshire, 4.viii.60 (Pl. I, figs. 7 and 9).

10th NOVEMBER 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs. K. Hayward, C. J. Pechey, and R. A. Jarman.

EXHIBITS

Mr. R. L. E. FORD—A cone of *Abies alba* Mill (Silver Fir).

Mr. A. A. MYERS—Three examples of *Paradrina clavipalpis* Scop. (Lep., Noctuidae) all taken at mercury vapour light in N.W. London. One, taken 31.v.59 has the forewings suffused with black; another, taken 4.x.60, has the ground colour darkened, the markings between the antemedial and postmedial lines obscured, the orbicular stigma obsolete, the reniform stigma present and the nervures darkened, giving a striate effect; the third normal example taken 22.v.60, was shown for comparison.

Mr. H. N. E. ALSTON—Larvae of *Leucania unipuncta* Haw. (Lep., Noctuidae) bred from ova laid by a specimen taken by Mr. E. W. Classey at Portland, Dorset, early in October. The larvae have been feeding on various grasses.

Dr. B. J. MACNULTY—A short series of *Chrysolina brunsvicensis* (Grav.) (Col., Chrysomelidae) taken on *Hypericum* in Monks Wood, Hunts., 1.x.60.

Mr. A. E. GARDNER—Two species of Coleoptera (Carabidae) taken at South Benfleet, Essex, 23.x.60; *Pterostichus macer* (Marsh.) and *Agonum marginatum* (L.). Mr. Gardner also commented on the deterioration of the Thames marshes at South Benfleet as a locality of entomological interest. In this he was supported by Mr. F. D. BUCK.

COMMUNICATIONS.

Mr. B. GOATER said he had seen a specimen of *Vanessa atalanta* L. (Lep., Nymphalidae) sitting on an oak in N. London on 1st November. He had seen another in flight in the New Forest, Hants, on the 6th November, when he had also seen a *Plusia gamma* L. (Lep., Noctuidae), *Sympetrum striolatum* (Charp.) (Od., Libellulidae) and a Great Grey Shrike had also been seen in the New Forest on the same occasion.

Referring to the *Leucania unipuncta* Haw. larvae shown, the PRESIDENT said that during the week which ended 15th October he had collected in the Portland area, and had taken seven imagines, all at mercury vapour light near Swanage and Weymouth in particular. He knew of other captures in the area and suggested that the moth may be breeding on this stretch of the coast; he further suggested that the insect might become more common here. Dr. C. G. M. DE WORMS said the species had been known from this part of the country for some time now but had never been common there. He cited a collector who

had worked the district for some 20 years and had only acquired two examples. The species, he said, never had a foothold here and could in no way be likened to *Leucania l-album* Haw., which had first obtained a foothold at the Lizard in Cornwall and then fanned out.

A discussion took place on the Annual Exhibition, the general opinion of the meeting being that though the exhibits were a little fewer than previously, the standard was quite as high as we have come to expect. Special mention was made of the extreme forms of *Arctia caja* L. (Lep., Arctiidae) which were caught wild, and it was queried whether this species was affected by the extraneous larvae released by lepidopterists breeding on a large scale. The President expressed the opinion that few of these larvae released from the protection of the breeding cage to the more severe natural conditions, did in fact survive. Of particular interest, too, was the black *Lycaena phlaeas* L. (Lep., Lycaenidae) of which Mr. Tams had photographed both upper and underside (see pl. I, figs. 7 and 9). Comment was also made on the interesting nature of Mr. F. V. L. Jarvis's experiments.

24th November 1960.

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs M. Collins, M. S. Collins, M. A. Eve, P. B. Wachter, J. W. Jarrett, R. F. McCormick and Dr. L. G. Higgins.

EXHIBITS.

Dr. A. M. MASSEE—An example of *Paratillus carus* (Newm.) (Col., Cleridae) an introduced Australian predator on *Lyctus* spp. (Col., Lyctidae), which turns up in Britain from time to time in all sorts of odd situations—not only in timber yards—so that it rather seems to have established itself, or to be in the process of doing so. The example shown was taken at Seal Chart, in a Maidstone and District bus, travelling from Maidstone to Sevenoaks, and is probably the first Kent record.

Mr. A. E. GARDNER—The following Coleoptera from Wood Walton Fen, Hunts., 20.xi.60: *Agonum mulleri* (Herbst) and *Badister sodalis* (Dufts.) (Carabidae), and *Chrysolina brunsvicensis* (Grav.) (Chrysomelidae).

Mr. T. R. EAGLES—(1) Leaves and berries of *Arum italicum* Mill., of garden origin. The plant is a rare British native and is exhaustively dealt with by Prime, C. T., (1960, Lords and Ladies, *New Naturalist* Special Volume, No. 17). (2) A dead branch of larch with fructifications of the discomycete fungus *Trichoscypha calycina* (Schaum. ex Fr.) Boud., the cause of Larch Canker, from Great Munden, Herts. The fungus was long known as *Dasyphypha calycina* Fuckel.

COMMUNICATIONS.

Mr. W. E. MINNION said he had seen a Great Northern Diver on a flooded gravel pit at Harefield, Middx., recently. The bird was still

in its summer plumage. Several members commented on the occurrence, and it would appear from their observations that the bird regularly occurs in the London area at this time of year but only in odd specimens. Of more interest, however, was the plumage which usually changes much earlier.

The LIBRARIAN announced that Mr. E. S. A. Baynes had presented to the Society about 70 miscellaneous separates and a run of the Transactions of the Suffolk Nauralist's Society. The separates deal mainly with migration and phenological records but there are many important items concerned with British and Continental Lepidoptera, and two on the dragonflies of Sussex.

Mr. N. D. RILEY gave a talk on 'The history of the Department of Entomology, British Museum (Natural History)', which he illustrated with a series of slides.

8th December 1960.

The PRESIDENT in the Chair.

The deaths were announced of Dr. G. S. Robertson and Major B. C. Barton, O.B.E.

On a proposition by Mr. C. N. Hawkins, seconded by Mr. S. N. A. Jacobs, Mr. G. Stoughton-Harris was again elected to serve as the Members' auditor. It was announced that Mr. R. M. Mere had been elected to serve as the Council's auditor.

EXHIBITS.

Mr. M. G. MORRIS—Six living examples of an *Anthonomus* (Col. Curculionidae) sp. which he believed to be *A. rosinae* Des G., and which is sometimes given as a synonym of *A. ulmi* Desbr., or as an aberration of *A. ulmi* Bedel. Kloet and Hincks (1945, *A Check List of British Insects*, Stockport, p. 213) synonymizes *A. ulmi* Desbr. with *A. inversus* Bedel. The specimens exhibited were beaten from hawthorn at East Malling, Kent, 7.xii.60.

COMMUNICATIONS.

A discussion took place on albinism in birds.

Dr. F. E. ZEUNER gave a talk on "Fossil Insects" which he illustrated with the lantern.

12th January 1961.

The PRESIDENT in the Chair.

The deaths were announced of Messrs. L. T. Ford, F. Rumsey and S. G. Wallis Norton.

EXHIBITS.

Mr. J. A. C. GREENWOOD—(1) A gynandromorphous example of *Bupalus piniaria* L. (Lep., Geometridae) from the collection of the late S. Taylor, probably caught at Oxshott, circa 1920. The left side and

left antenna is female and the right side and right antenna is male. (2) *Leptidea sinapis* L. (Lep., Pieridae) taken in the Burren of Clare, Ireland, 5 to 19.viii.60, where the species was restricted and not numerous, ten examples were taken. (3) Insects taken in the U.S.A. (New York City and Chicago) and Canada (Toronto, Montebello and Montreal), 26.ix. to 4.xi.60. Almost all were taken at rest by day or on lighted windows after dark.

Dr. C. G. M. DE WORMS—An example of *Erebus walkeri* Butler (Lep., Noctuidae), a central and west African species, found on an outward bound aircraft at London Airport, Middx.

Mr. A. E. GARDNER—The giant water bug *Lethocerus indicus* L. & S., taken in Ceylon, January 1960, by Mr. W. H. Reay.

Mr. D. P. L. MATTHEWS—A case of Insects from an island off the Yugoslav coast, taken in June 1960.

Mr. T. R. EAGLES—(1) Elm leaves galled by *Eriosoma lanuginosum* (Hartig) (Hem., Aphididae) and (2) the liliaceous plant *Ruscus aculeatus* L. (Butcher's Broom) with ripe fruits and flowers on the cladodes. Both from Enfield, Middx.

COMMUNICATIONS.

Extracts were read by Mr. F. D. BUCK from a letter received from Dr. B. P. Moore now in Australia.

Referring to Mr. Gardner's exhibit, Mr. M. W. F. TWEEDIE said he had kept this bug alive in an aquarium in Malaya and he drew attention to the unusual feeding habits. The insect injected into its prey, possibly a fish, digestive juice which liquifies the flesh, which the bug then sucks out. When the bug is finished the fish is then a skin bag containing little more than the bones.

Dr. A. M. MASSEE commented on the aphid responsible for the elm leaf galls shown by Mr. Eagles. He said that the aphid only occurred on elm during the winter and spring. In the summer it migrated to the roots of *Ribes* where it feeds.

A specimen of *Gonepteryx rhamni* L. (Lep., Pieridae) had been seen on the wing on 1st January by Mr. W. E. MINNION, who suspected it had been disturbed from hibernation in some near-by holly.

Slides were shown by Dr. C. G. M. de Worms, Messrs. W. E. Minnion, D. P. L. Matthews, S. Wakely and M. W. F. Tweedie.

26th JANUARY 1961.

89th ANNUAL MEETING

(With which was combined the Ordinary Meeting)

The President, Mr. R. M. MERE, V.R.D., M.A., F.R.E.S., in the Chair.

The Hon. Treasurer, Mr. J. L. HENDERSON, presented his Report and Accounts and moved their adoption; they were seconded by Mr. R. W. J. UFFEN and carried.

The Hon. Secretary, Mr. B. GOATER, read the Council's Report and moved its adoption; the motion was seconded by Mr. R. G. CHATELAIN and carried.

The President declared the following Officers and Ordinary Members of Council elected for 1961:—*President*: A. M. Massee, O.B.E., D.Sc., F.R.E.S.. *Vice-Presidents*: R. M. Mere, V.R.D., M.A., F.R.E.S., and A. E. Gardner, F.R.E.S. *Treasurer*: J. L. Henderson. *Secretary*: B. J. MacNulty, B.Sc., Ph.D., F.R.E.S. *Editor*: F. D. Buck, A.M.I.P.T.G.M., F.R.E.S. *Curator*: M. G. Morris, F.R.E.S. *Librarian*: T. R. Eagles. *Lanternist*: L. Christie. *Ordinary Members of Council*: J. D. Bradley, F.R.E.S., H. G. Denvil, F.R.E.S., F.R.H.S., N. E. Hicken, B.Sc., Ph.D., F.R.E.S., G. H. Mansel, D. P. L. Matthews, T.D., A. C. R. Redgrave, N. D. Riley, C.B.E., F.R.E.S., F.Z.S., B. F. Skinner, F. T. Vallins, A.C.I.I., F.R.E.S., C. G. M. de Worms, M.A., Ph.D., F.R.I.C., F.R.E.S., M.B.O.U.

The following new members were declared elected: Messrs. C. R. B. Baker and P. J. Baker.

EXHIBITS.

Mr. A. E. GARDNER—Odonata from Gan, Maldives Islands, taken by Mr. W. H. Reay during 1960: *Anax guttatus* (Burm.) male and female, and a female *Agriocnemis pygmaea* (Ramb.), one of the smallest dragonflies known.

Mr. B. GOATER—A female *Mutilla europaea* L. (Hym., Mutillidae), an apterous species parasitic on bumble bees.

COMMUNICATIONS.

A discussion took place on a reported possible danger to the Hell Coppice, Oxfordshire, locality for *Strymonidia pruni* L. (Lep., Lycaenidae).

The PRESIDENT commented on the difficulty of rearing *Macrothylacia rubi* L. At the suggestion of Mr. R. I. Lorimer he placed two larvae in a plastic box and put them into a refrigerator for five weeks. They were then transferred to an airing cupboard, and one spun up immediately, the other spinning up three weeks later. The first moth had emerged the previous evening (25th).

The President then read his Address, and vacating the Chair inducted the new President, Dr. A. M. MASSEE.

Dr. Massee thanked the meeting for honouring him in this way and moved a vote of thanks to Mr. Mere with which he combined a request for permission to publish his Address. When replying Mr. Mere gave this permission.

Mr. S. N. A. JACOBS moved a vote of thanks to the Officers and Council which was seconded by Mr. S. WAKELY. Mr. F. T. VALLINS replied.

The TREASURER proposed a vote of thanks to the Auditors to which Mr. R. M. MERE replied.

THE PRESIDENT'S ADDRESS.

Read by Mr. R. M. MERE, F.R.E.S.

Read 26th January 1961.

It is customary for the outgoing President to give an address divided into two parts. In the first he states how unworthy he was to have been given the honour of the Presidency; he says how easy his year of office has been made by the assistance of the other Officers and Council; and he continues with a few comments, saying kind words about some of the Officers. This is followed by a short obituary of members who have died during the year, and then comes the main part of the address devoted to the President's chosen subject.

I had thought to keep the first part of my address very short, but I must take this, my one opportunity, to record what is owed to the Officers and Council.

All your Officers and their Assistants have their own profession or business to carry on. Yet they willingly devote much of their strictly limited spare time to this Society. I have been greatly helped by the wise advice and support of Mr. Vallins and Dr. Massee, the vice-Presidents. Few realise the volume of work carried out by other officers. Mr. Henderson, for example, keeps the accounts and collects over 500 subscriptions, some of them needing several letters to obtain. You have seen the long list of the books in our library in the 1959 Proceedings. The length of that list indicates that Mr. Eagles has much to do. The work of Mr. Morris, our new Curator, is substantial. It is carried out efficiently and without fuss by him and the Assistant Curators, to all of whom we owe a great deal. Year after year, Mr. Howarth arranges a splendid series of indoor meetings. We have been particularly fortunate in 1960 in having some outstanding talks. Many of you will long remember the evenings when we had Dr. Kettlewell, Dr. Skaife and Professor Zeuner here. Mr. Uffen arranges our field meetings with imagination, and I believe they are known for their interest by a wide circle outside our members. A special word is due to our Editor, Mr. Buck, and his assistants for the excellence of our Proceedings and Transactions. We are fortunate that Mr. Buck is professionally connected with printing, for we have the advantage of his professional as well as his wide entomological knowledge and advice. Finally I owe a special word of thanks to our retiring Secretary, Mr. Goater. You probably do not realise the large amount of hard and dull work which he has so quietly and efficiently carried out, mainly on Saturday afternoons and Sundays.

In short, the Officers and Council of 1960 were enthusiasts. So long as this state of affairs continues, the "South London", under whatever name, will continue its happy and successful course.

I would like to welcome Dr. MacNulty, our new secretary, who, I am sure, will prove as helpful to Dr. Massee as Mr. Goater has to me.

You have heard the reports of the Council and Treasurer for 1960. You will agree that both are satisfactory, although we overspent our income. We have had surpluses in recent years, so there is no great harm in having overspent in 1960.

We have again suffered heavy loss by death.

Dr. G. S. Robertson joined the Society as long ago as 1910, and was a well-known lepidopterist. We had not seen much of him recently, but I understand he frequently attended meetings in the past. He was generous to the Society. Within the last few years he gave us the illustrated edition of Fowler's *Coleoptera of the British Islands*.

Captain G. S. Wallis-Norton was a life member who joined us in 1935. He lived at Eastbourne, and at meetings told us of many interesting observations he made at Beachy Head and elsewhere near his home.

Mr. C. C. Phelps, M.B.E., became a member in 1946, Mr. A. H. Lanfear in 1947, and Major B. C. Barton, O.B.E., in 1953. We did not see as much of any of them as we would have liked.

Mr. F. Rumsey became a member in 1947, and was a welcome and well-known figure at both our indoor and field meetings, which he attended regularly. He was interested in Lepidoptera, and some years ago extended his interest to the 'micros'. He was a successful breeder, and a good field entomologist, always generous and helpful. We shall all miss him greatly.

Finally, although his death was not until 1961, I must record the passing of Mr. L. T. Ford, who joined the Society in 1920, and was our President in 1947. He was a leading authority on the microlepidoptera of Britain. His collection contained bred series, beautifully set, of most of the micros, and was unrivalled outside museums. He attended our meetings regularly until prevented by ill-health, and it was a great pleasure to see him at our Exhibition as recently as last October. He was outstandingly successful as a breeder. He discovered in England a species new to science which he named after his wife, *Nepticula marionella*. He was the author of *A Guide to the Smaller British Lepidoptera*, and contributed a number of valuable notes to the entomological press. His outstanding characteristic was his modesty. He was always kind and generous, very willing to impart knowledge and help the beginner. He will be greatly missed.

We have already stood in memory of these members, and I am not asking you to do so again.

I now come to the second part of my address, which I have called:—

THE RECENT COLONISATION OF ENGLAND BY NEW SPECIES OF MACROLEPIDOPTERA.

The boundaries of human knowledge are being enlarged at an ever increasing rate. We, in this the second half of the twentieth century, accept this new knowledge as something which is natural and normal. It is neither natural nor normal save in two restricted senses: the inborn curiosity of the human mind, and the momentum to further knowledge and discovery which each new discovery produces.

A hundred years ago, it was still possible for a brilliant man to have a good knowledge of the sciences as then known, and to propound his philosophy, based on a large part of the sum of human knowledge. This

is now utterly impossible. Each subject is too specialised. It is obvious that a number of factors may affect the insect population of an area. This evening I shall be talking of changes in the distribution of some macrolepidoptera in Britain, and a possible cause of the changes. But because of my lack of knowledge of so many subjects, it may well happen that I am unaware of some possible reasons for the change.

There are many British Lepidoptera with a wide distribution, some continuous, some discontinuous, in which it is impossible to distinguish any difference between series taken in different localities in the British Isles. *Noctua (Triphaena) pronuba* L. (Large Yellow Underwing) is an example with continuous distribution; *Anarta myrtili* L. (Beautiful Yellow Underwing) with discontinuous distribution. By way of contrast the appearance of some species varies from district to district. Such are *Polia nebulosa* Hufn. (Grey Arches) and *Eumichtis lichenea* Hübn. (Feathered Ranunculus). This is likely to be because the constant form species move about on a large scale all over their range. Conditions in different parts of the range must differ considerably, so that the appearance of the insect best suited for survival in one extreme of these conditions is likely to differ from that best suited to the opposite extreme. Yet the appearance is identical. This is probably the result of the flow of genes caused by a large movement of individuals throughout the area. An individual specially suited for one extreme of the range will be ill-adapted for the greater part of the range, and will not be evolutionally successful. The gene which produces viable combinations in the greatest number of different genetic backgrounds, or, put in another way, the form which is on average best suited to the whole area of distribution, will, if the movement within the area is sufficient, be the form found throughout the area (see Mayr, 1954).

From the large number of our Lepidoptera which are invariable in form and widely distributed, it is clear that much movement of individual insects is constantly taking place, without regard to any change of climate or other ecological change. There are comparatively few species which are widespread, invariable from district to district, and which we can say now occur in areas where, before, they certainly did not occur. There are a few, for example, *Polygonia c-album* L. (Comma), *Limnitis camilla* L. (White Admiral), and *Pararge aegeria* L. (Speckled Wood) which have recolonised large areas from which they had disappeared. *Cucullia absinthii* L. (Wormwood Shark) has in the last 15 years spread to the Midlands and around London where it was formerly completely unknown. There are other insects which may have spread. *Nonagria sparganii* Esp. (Webb's Wainscot), *N. geminipuncta* Haw. (Twin-spotted Wainscot), *Chilodes maritima* Tausch. (Silky Wainscot), and *Leucania obsoleta* Hübn. (Obscure Wainscot) were all discovered in the marsh on Tresco, Isles of Scilly, within the last few years (Richardson & Mere, 1958). This was a considerable extension of the known range. It is likely that these insects would have been recorded from the Scillies had they been present forty years earlier.

Though more examples might be given, so far as our limited

knowledge extends it is clear that the spread of our indigenous Lepidoptera in recent years is a limited phenomenon. Not many species are involved.

Conversely, there are some species which now have a more restricted distribution than in the past. Bretherton (1951) has written comprehensively about our lost butterflies and moths. He considers that change of climate may have led to the extinction of a few species, but the major cause, where cause can be postulated, was drainage with resulting changes, including possibly an increase in the numbers of birds.

Since our climate has tended to become warmer in the last 40 years, one would expect some species to have been driven northwards, and some northerly species to have become extinct. *Drepana binaria* Hufn. (Oak Hooktip) and *Vanessa io* L. (Peacock) have both spread northwards in recent years, but this tendency is not particularly marked. Except for *Apamea pabulatricula* Brahm. (Union Rustic), none of the extinct species was predominantly northern in distribution. Of the existing species, *Endromis versicolora* L. (Kentish Glory) has a predominantly northern distribution abroad, and with us appears to be in retreat northwards, over the last 80 years or more.

Right up to the 1870's, a new species of macrolepidoptera was found nearly every year in Britain. By 1880, it was something quite out of the ordinary for a new species to be discovered. This state of affairs continued at any rate till the late 1930's, since when the discovery of new resident Lepidoptera has approached the rate of discovery of the 1850's and 1860's. In those days the discoveries were made in working previously unworked places. Almost all our modern discoveries are of insects that simply were not here a few years previously. I exclude the cases in which what was once thought to be one species has been found to be two, or three, or even four different species.

Now here is a change we can regard as reliable. There is no longer the problem of trying to decide whether a species has or has not increased or contracted its range. New knowledge of distribution resulting from the use of mercury vapour light becomes irrelevant if the species was previously absent altogether.

There are four reasons for saying that many of our new discoveries of recent years are not indigenous species, but have established themselves here from abroad.

First, many collectors of former times were hardworking and persevering. They would not have overlooked insects such as *Hadena compta* Schiff. (Varied Coronet), *Xanthorhoe biriviata* Borkh. (Balsam Carpet) and *Calophasia lunula* Hufn. (Toadflax Brocade). All these, and others too, are easy to find as larvae, and *H. compta* and *X. biriviata* would have been found in the imaginal state, as indeed they were on first discovery, without the use of mercury vapour light.

Secondly, some of our new species feed here on introduced food-plants not available some 100 or 120 years ago. Thus *X. biriviata* feeds on *Impatiens capensis* Meerburgh (*biflora* Walt.), and *Lithophane*

leautieri Boisd. (Blair's Pinion), and possibly *Eupithecia phoeniceata* Ramb. (de Worms' Pug) on *Cupressus macrocarpa* Gord.

Thirdly, it is well known that attempts to introduce or reintroduce Lepidoptera have almost invariably failed; witness the many failures to establish *Nymphalis antiopa* L. (Camberwell Beauty) and to re-establish *Aporia crataegi* L. (Black-veined White). There is not the slightest evidence to suggest that any of our new species have been deliberately brought here by man.

Fourthly, through the modern increase in both volume and speed of travel, such as car ferries by air, and the increase in the amount and kinds of artificial light, such as mercury vapour lamps, the accidental introduction of insects has become more likely.

De Worms (1951) wrote about those new species discovered here in the first half of the 20th century. I want to acknowledge the help which his article has been to me.

The most recent discovery is a remarkable one, *E. phoeniceata* Ramb. The *Eupithecia* group is not one noted for migration. Yet one specimen of *E. phoeniceata* was taken at mercury vapour light by Mr. J. L. Messenger in company with Dr. de Worms during September 1959 in South Cornwall (de Worms & Messenger 1960). In September 1960 two further examples were taken by Mr. Austin Richardson in the same general area. He has informed me that they were captured in the vicinity of a garden where *Cupressus macrocarpa* was growing. A fourth specimen was taken in September 1960 by Mr. Frank Lees at his home at Maidencombe, South Devon. Mr. Lees has run a light trap at his home ever since the war, and it is inconceivable that he would not have taken *E. phoeniceata* in the past if it had been there. The south Cornish coast is not a well worked district entomologically, but there are resident collectors, and it is impossible that this striking *Eupithecia* could have been overlooked in September had it existed there in the past. Not a great deal seems known about this insect abroad. Culot (1919-20) states that it inhabits both shores of the Mediterranean, that the larva feeds in December and January on *Juniperus phoenicea* L., and that the insect flies in September-October. Lhomme (1923-35) states that so far as France is concerned the larva feeds on *J. phoenicea*, *Dorycnium suffruticosum* Vill., *Cupressus sempervirens* L., and generally on *Cupressus*. He gives various localities on the Mediterranean coast from Marseilles eastwards. On the Atlantic coast, I understand it occurs as far north as Bordeaux. I do not know if *E. phoeniceata* occurs in Spain. It is interesting that in 1959 one was recorded in Brittany, and another taken in Jersey in 1960. What is clear is that it has come a very long distance and from a very different and much warmer climate. On the existing evidence it seems likely that it is established here, and is spreading.

Xanthorhœ biriviata Borkh. (Balsam Carpet) was first found in May 1955 (Minnion & Goodban 1956) in the Thames Valley north of the

Thames, and has since been found in Surrey. *X. biriviata* is found in northern France, Belgium and Denmark, and may have reached us from any of these countries. The remarkable fact about this insect is that its continental foodplant is *Impatiens noli-me-tangere* L., confined here to the Lake District and North Wales, while *X. biriviata*'s foodplant here is *I. capensis* Meerburgh, an introduced plant, recorded from the Thames Valley, Dorset, Staffordshire, Leicestershire, and Glamorgan. It seems not unlikely that *X. biriviata* will gradually spread to other areas in the Thames Valley, and perhaps further afield.

Hydraecia hucherardi Mab. (The Marsh Mallow) was first recorded as taken in England in Sussex in 1952. A second specimen was taken in Sussex, and a third in Kent in 1953. It was then found to be well established in the Romney Marshes (Goodson, 1955). *H. hucherardi* does not seem to have spread beyond the Kent-Sussex coastal area, though its foodplant, *Althea officinalis* L., is widespread in suitable coastal localities as far north as southern Scotland. I used to regard *H. hucherardi* as a resident of long standing, but overlooked. I have now changed my mind, and regard it as a recent addition to our fauna, probably emanating from the coast of Brittany.

Euphyia luctuata Schiff. (The White-banded Carpet) was twice recorded in the 1920's, once in Essex and once in Kent, but these specimens were apparently quite casual. Nothing more was heard of *E. luctuata* until it was again taken in Kent in 1950 (Haggett 1952), where it was subsequently found to be well established over a limited area. This is still the case, though it has spread into Sussex. The foodplant, *Chamaenerion angustifolium* (L.) Scop., is now widespread and common. I find it surprising that *E. luctuata* has not spread further afield. It probably reached us from France or Belgium.

Lithophane leautieri Boisd., which was earlier believed to be *L. lapidea* Hübn., was first taken in 1951 in the Isle of Wight. The second British record was at Eastbourne, Sussex, where it was taken by the late Mr. Eldon Ellison in his garden at mercury vapour light in 1954 (Ellison 1955). Mr Ellison had worked light in his garden in previous years, and it looks as if *L. leautieri* did not reach Eastbourne until 1954. Mr. Ellison continued to observe *L. leautieri* in his garden in increasing numbers until he left Eastbourne in 1958. In the meantime, there was no further record from the Isle of Wight until 1956 (Mere 1956), where it was later found to be well established. Nearly every year, the Freshwater marsh was worked in early October for *Sedina buettneri* Hering (Blair's Wainscot). It is certain that *L. leautieri* would have been recorded several times at Freshwater before 1956 had it then been well established. More recently *L. leautieri* was found at Swanage in 1959, and in South Devon (F. Lees in litt.), Surrey (Fairclough 1960) and north-east Hampshire (D. Wright verbal communication) in 1960. It seems that this species is now in process of rapid expansion, and that it will speedily colonise the south of England wherever there are good growths of mature *Cupressus macrocarpa* Gord. It is interesting to note that, like *Xanthorhoe*

biriviata Bork., *L. leautieri* has changed its foodplant. On the continent it is recorded on Juniper and species of Cypress, but not so far as I know on *C. macrocarpa* Gord. *L. leautieri* has a number of forms abroad: that occurring here is stated to be identical to the form from the Gironde area of south-west France, and is likely to have originated from there (see Boursin 1957).

In his article already referred to, de Worms (1951) listed 11 species in a class which appeared to have only a very slender foothold on these shores, or might have owed their existence or record here to importation inadvertently through human agency. He added that in each instance there seemed to be no evidence that the species had any permanent residence here. This is no longer true of two species listed, and is perhaps untrue of a third species.

The first species, *Calophasia lunula* Hufn., de Worms (1951) refers to a 1939 and to a 1950 record, both from Sussex. It was taken in Kent, Sussex and Essex in 1953, and found to be breeding (Classey 1954). It does not appear to have spread: indeed I am not aware of any recent Essex records. It is still to be found in some plenty in Kent, and probably also in Sussex. *C. lunula* probably reached us from the French coast.

The second species is *Thalera fimbrialis* Scop. (The Notched Emerald). This has been taken once at Eastbourne since 1950, and is apparently still breeding in one locality in Kent, where it has been established for at least ten years. Unfortunately its status is somewhat precarious, and I fear it may be wiped out. It is possible that it is a species which secures a foothold here for some years from time to time, but is liable to disappear. But I prefer to regard it as permanently established, though in danger from road widening and other works of man destroying its limited breeding area.

The third species is *Cosymbia pupillaria* Hübn. (Blair's Mocha). De Worms (1951) mentions one in the Isle of Wight in 1946, one in Dorset in 1947, and refers to an old record of two in the Scillies in the latter part of the 19th century. He says it is a species of more southern climes, and that it is doubtful if it can become resident. However, it was found to be breeding on Tresco, Isles of Scilly, where it was taken in 1956 and 1957 (Richardson & Mere 1958). It is possible that it had bred there for many years. During the last five years it has been recorded from Devonshire, Dorset, Somerset and Sussex (French 1957), Kent (Manley 1956), Surrey (Dacie 1960), also Bucks. and Middlesex. It may be resident on the mainland, but it is more likely that it has increased its migratory range, or started regularly to migrate from France. There it is found mainly in the south from the Pyrenees to the Alps, and has been recorded from the Department of Seine-et-Marne, but whether as a resident or casually I do not know. It does not seem to occur in Belgium, but has been recorded in Denmark as a migrant.

There are some more species to be mentioned, all of which are in a somewhat different category from the foregoing. *Hadena compta*

Schiff. had already in 1948 established itself at Dover (Youden 1950). Since 1950, it has been recorded as far west as Dungeness (Haxby 1960). Its main spread has been north eastwards. It is now well established in Herts. (Craufurd 1960), Cambridgeshire (Ford 1960) and Suffolk. This spread is likely to continue. *H. compta* presumably first reached Dover from the nearby coast of France.

Eupithecia millefoliata Rössl. (The Yarrow Pug) was first noted here in 1939, though it was not identified accurately until later. It is now well established along the south coast from east Kent to west Sussex. I would expect this species to spread, but it does not seem to be doing so.

Apart from some half dozen odd examples, *Leucania l-album* L. (White L Wainscot) was unknown in England until 1933, when several were noted at The Lizard, South Cornwall. By 1935 it had spread to Prawle, South Devon, and in 1938 large numbers were taken there (de Worms, 1951). By 1950 it had spread in both directions along the south coast, was taken regularly at Portland and Swanage, and was recorded from Freshwater, Isle of Wight. It has recently become much more plentiful from Swanage to Penzance, and at Freshwater; and has also occurred in the Christchurch area of Hampshire. It is one of the commonest Lepidoptera in early October at Portland, perhaps being exceeded in numbers by none but *Plusia gamma* L. (Silver Y) and *Phlogophora meticulosa* L. (Angle Shades). Yet the Rev. Guy Ford, who lived and collected at Portland from 1935 to 1939, has told me that he never saw *L. l-album* there. This species is widespread in France, and doubtless first reached England from there. From its recent strong increase in numbers, it must sooner rather than later reach Sussex and Kent, and in the other direction spread along the north Cornish and Devon coasts, probably reaching South Wales.

Finally, there is *Leucania unipuncta* Haw. (White Speck Wainscot). This has long been known as a migrant, occurring as a great rarity on the south coast from Kent to Cornwall and in South Wales. South (1946) states that about a score were recorded in England and Wales up to 1930, and some 58 were taken in Co. Cork in 1928. It was first met with in England in quantity in the Isles of Scilly, some 80 being taken in the autumn of 1957 (Richardson & Mere, 1958). It is now breeding there. During the last three or four years the frequency of records has become much greater than in the past from the coasts of Cornwall, Devon, Dorset, and the Isle of Wight. I personally know of some dozen taken on the Dorset coast in the autumn of 1960; it appears to be breeding at Portland and probably elsewhere, too. I expect that *L. unipuncta* will become well established and as common as its close relation *L. l-album*, and will extend its range fairly rapidly eastwards to Kent and northwards to south Wales. I prophesy this with some hesitation, knowing that it is quite at variance with the views of at least one learned expert for whose opinion I have the highest respect.

There are, of course, other moths of which interesting records have occurred in the 1950's, such as *Lithacodia (Jaspidia) deceptor* Scop.,

Plusia confusa Steph., *Plusia biloba* Steph., and other members of *Plusia* and allied genera, well known for their migratory habits. But the records are too sparse for reliable conclusions to be drawn. It is possible that similar records would have been made regularly in the past had mercury vapour light been in use on the present-day scale.

There is also *Sedina buettneri* Hering to be considered. It was discovered in the Isle of Wight in 1945 in Freshwater Marsh. I am informed that until the early 1930's this marsh was rough grazing, and not covered with reed, *Carex*, etc., until later, though there were always ditches with reed, *Carex*, etc. in them. It follows that *S. buettneri* could not have been in this marsh for long. I assume, with some hesitation, that the species arrived a year or so before 1945. It seemed well established, but was wiped out by fire.

From what I have said it is clear that some seven to ten species have succeeded in the last 15 years in colonising an area in southern England in what appears to be a permanent manner. I refer to *Xanthorhoe birivata* Bork., *Hydraecia hucherardi* Mab., *Euphyia luctuata* Schiff., *Lithophane leautieri* Boisd., *Calophasia lunula* Hufn., *Hadena compta* Schiff., and *Leucania unipuncta* Haw. and, with some reserve, to *Eupithecia phoeniceata*, Ramb., *Thalera fimbrialis* Scop. and *Cosymbia puppillaria* Hübn.

De Worms (1951) refers to six further species considered in 1900 to be only casual migrants, which have since proved to be or to have become regular breeding species. These are *Oria musculosa* Hübn. (Brighton Wainscot), *Minucia lunaris* Schiff. (Lunar Double Stripe), *Catocala fraxini* L. (Clifden Nonpareil), *Cirrhia* (*Mellinia*) *ocellaris* Borkh. (Pale Lemon Sallow), *Parascotia fuliginaria* L. (Waved Black), and *Aplasta ononaria* Fuessl. (The Rest Harrow). I take the view that all these except *A. ononaria*, and possibly *M. lunaris*, were in fact breeding species in the 1930's.

I know of no species which colonised England between 1880 and 1930 except *Polychrisia moneta* F. (Golden Plusia).

Thus from 1880 to 1945, say, a period of 65 years, there were five colonists, namely *Polychrisia moneta* F., *Aplasta ononaria* Fuessl., *Leucania l-album* Haw., *Eupithecia millefoliata* Roess. and *Sedina buettneri* Hering. During the next 15 years the number is seven to ten. This difference cannot be fortuitous. Put another way, 1880 to 1930, 50 years, one; 1930 to 1960, 30 years, 11 to 14.

It is true that in two or three cases lack of suitable foodplant might have prevented a species establishing itself here 60 or 100 years ago. But that does not apply to the period 1900 to 1945.

What can have caused the remarkable differential, one in 50 years, 11 to 14 in 30 years?

It might be due to a lessening number of predators or parasites. It might be due to acquiring greater resistance against disease. It might be due to some man-made change in ecological conditions. I know of no evidence whatever to support any of these possibilities.

The most likely cause is change of climate. It could be that the

climate here, or the climate in the country of origin, or both, have changed. It could be that the last 30 years have been favourable, or the previous 50 years particularly unfavourable, or again both.

If a favourable change of climate occurs, it is not to be expected that a sudden rush of new arrivals will invade our shores. We do not know how many attempts to colonise are failures. We can only know of the successful attempts. Many of our new species are unlikely to cross even the narrows of the English Channel every year. It must also be realised that some years may well pass before a new resident species is discovered. *Xanthorhoe birivata* could have been breeding here for a few years before it was discovered in 1955.

The recent wave of colonisation started about 1933 with *Leucania l-album* L. This would seem reasonable, on the basis of an improvement in climate starting in the 1920's. The main wave of new species appears to have arrived between 1945 and 1955. This, allowing for unsuccessful attempts to colonise and delay in discovery of new colonists, tallies well with what is known of temperature.

Writing in 1959, and dealing with ten year moving average of atmospheric pressure and temperature in Britain, Glasspoole (1959) says:—"The most outstanding trend is undoubtedly the increase of temperature from about 1922-31 to 1943-52".

De Worms (1958) in a most interesting paper contributed to the Tenth International Congress of Entomology, 1956, gave evidence for a distinct northward movement of a number of species of Lepidoptera, mainly from the more southerly parts of Europe, which had resulted in the colonisation of England, with a similar and parallel movement to other parts of Europe, especially Denmark. He discussed the possible relationship of this northward trend and apparent recent climatic change in the light of the fact that the northward trend had also been observed in both birds and fishes. By climatic change, increase in temperature is meant, as evidenced by retreat of glaciers, etc.

Lewis (1950) has produced enlightening charts showing mean winter spring, summer, autumn, and annual temperatures at Oxford on a 20 year running average terminating at the year stated. These charts are reproduced here by the kind permission of *The Meteorological Magazine* in which they were first published. The charts run from 1834, which shows the average temperature of the years 1815 to 1834, to 1950, which similarly shows the average temperature of the years 1931 to 1950. It is clear how low, that is unfavourable, the curve has been since 1880, (1860 to 1880 average), until well into the 1930's, (1910's to 1930's). If winter is ignored, when it may be assumed that the ova, larva or pupa is unaffected by, or sufficiently protected from, cold, all seasons have shown startling rises from about 1940, (1920 to 1940 average), to 1950, (1930 to 1950 average). I have been unable to attempt to bring these charts up to date. The general trend during the last ten years has been as follows. The autumn temperature has been indeterminate: it is not clear whether there has been a turning



OXFORD, 20-YEAR RUNNING AVERAGES TERMINATING AT THE STATED YEAR

point or whether it is still continuing to rise. The summer temperature has fallen. The spring temperature has started to fall. Nevertheless, from the high point on the charts of 1950, the extension to 1960 would show that temperatures have remained above average for spring, summer, and especially autumn.

Here then is evidence to support the contention that increases in our spring, summer and autumn temperatures is a cause of the recent colonisation.

I would add that evidence is available to show that in the 1940's and early 1950's new species of the microlepidoptera established themselves in the south of England in contrast to the previous 50 year period from 1880 to 1930.

It will be interesting to see how new species fare in the years to come. Can they survive a cooler spell? And what species will comprise the inflow of new insects if our climate continues to become warmer? There is still plenty of room for an increase of temperature before we are as warm as in the days of William the Conqueror. In the Domesday Book 38 vineyards were recorded in England in addition to those of the King!

With this thought I will end my talk, having perhaps suggested the subject of some future Presidential Address.

My thanks are due to the Controller of H.M. Stationery Office for permission to reproduce the figure from Mr. L. F. Lewis' paper.

APPENDIX.

PART I. Resident Species first discovered or recognised since 1880

- 1883 *Apamea exulis* Lef. It is assumed that this is a different species from *A. assimilis* Doubl.
 1888 *Thymelicus lineola* Ochs.
 1895 *Leucania favior* Barr. Possibly previously confused with *L. pallens* L.
 1907 *Zygaena loti* Schiff. (*achilleae* Esp.).
 1909 (about) *Luperinia nickerlii* Freyer s.sp. *guenéei* Doubl. Although discovered here and named in 1861, was not recognised earlier as a species.
 1925 *Aegeria flaviventris* Staud.
 1949 *Calamia tridens* Hufn. (*Luceria virens* L.).

NOTE.—There are numerous cases of a species being separated into two, three or even four species, such as *Hydraecia nictitans* Borkh. which was found to comprise *H. oculate* L., *H. lucens* Freyer, *H. paludis* Tutt, and *H. crinanensis* Burrows. All these are excluded. It was not the occurrence of the insect that was discovered, but its identity.

Part II. New Species first discovered or re-established since 1880, excluding casual records

- 1890 *Polychrisia moneta* F. First record.
 1933 *Leucania l-album* L., excluding six records before 1930.
 1937 *Aplasta ononaria* Fuessl. Re-established.
 1939 *Eupithecia millefoliata* Rössl. First record.
 1945 *Sedina buettneri* Hering. First record.
 1948 *Hadena compta* Schiff., excluding one post 1930 and some suspect old records.
Lithacodia (Jaspidia) deceptor Scop. First record. Status doubtful.
 1950 *Euphyia luctuata* Schiff., excluding two records before 1930.
Thalera fimbrialis Scop., excluding one record before and three after 1930.

- 1953 *Calophasia lunula* Hufn., excluding two records after 1930.
Hydraecia hucherardi Mab., excluding a 1952 record.
 1954 *Lithophane leautieri* Boisd., excluding a 1951 record.
 1955 *Xanthorhoe biriviata* Borkh. First record.
 1956 *Leucania unipuncta* Haw. Many migrant records, but now breeding.
Cosymbia puppillaria Hüb., excluding two old and two post 1930 records.
 1959 *Eupithecia phoeniceata* Rambur. First record.

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FIELD MEETINGS, 1960.

BOOKHAM, SURREY—10th April 1960.

Leader: Mr. F. M. STRUTHERS.

On this, the first field meeting of the year, a party of six were fortunate to have a fine day. The temperature was around 50° F. and there were long sunny spells. Very few insects were flying, probably due to the blustery south-west wind. The only butterfly seen was *Nymphalis io*, L., but there were a few *Eriocrania* species flying around the birch trees. There was also an abundance of willow catkins but the males were nearly over. The blackthorn was in bloom, some primroses were also out, and a few of the earliest flowers of *Stellaria holostea* L. were noticed. The only moss doing well was *Dicranoweisia cirrata* (Hedw.) Lindb. Imagines of *Eupithecia abbreviata* Steph. and *Ectropis crepuscularia* Hübn. were found at rest on tree trunks.

Larvae of *Hemithea aestivaria* Hübn., *Opisthographis luteolata* L., *Campaea margaritatta* L., and *Phigalia pilosaria* Schiff. (*pedaria* F.) were obtained by beating hawthorn. Willow twigs were searched for the galls of *Aegeria flaviventris* Staud. and several were found. Larvae of *Phthorimaea tricolorella* Haw. were discovered in spun shoots of *Stellaria holostea* L., whilst those of *Apeira* (*Selenia*) *syringaria* L. and *Lithocolletis trifasciella* Haw. occurred on honeysuckle.

Coleoptera noted were *Elaphrus cupreus* Duft., *Rhynchites coeruleus* (Deg.) and *Drupenatus nasturtii* (Germ.) five of which were found at the base of a *Typha* plant; and although the hawthorn was not in bloom many *Lochmaea crataegi* (Forst.) and *Anthonomus pedicularius* (L.) were beaten from it.

At the foot of a willow, on the ground in a damp place, a flourishing growth of the uncommon fungus *Pholiota aurea* (Maitusch) Fr. was found, and *Bulgaria inquinans* Fr. was noted on a fallen bough nearby.

The Tawny Owl was seen, and the Willow Warbler, Chiff-chaff and Great Spotted Woodpecker heard. A nest of the Long-tailed Tit was found in a dense clump of blackthorn.

Among the Diptera the following were reported: *Ormosia lineata* Macq., *Bibio johannis* (L.), *Lonchoptera lutea* Panz., *Chilomyia* (*Cheilosia*) *corydon* Harris (*grossa* (Fall.)), *Metasyrphus* (*Syrphus*) *luniger* Meig., *M.* (*S.*) *consisto* Harris (*carollae* (F.)), *Tubifera tenax* (L.), *Platycheirus albimanus* (F.), *Sepsis cynipsea* (L.), *Dichaeta caudata* (Fall.), *Phytomyza ranunculi* Schr., *Elachiptera cornuta* (Fall.), *Scopeuma stercorarium* (L.), *Gymnochaeta viridis* (Fall.), *Lypha dubia* (Fall.), *Calliphora erythrocephala* (Meig.), *Dasyphora*

cyanea (Meig.), *Egle muscaria* (F.), *E. parva* R.-D., *Helmia lucorum* (Fall.) and *Nupedia dissecta* (Meig.).

Nemoura variegata Ol. (Plec.) was also reported.

An enjoyable tea at the Grange Hotel concluded the day.

BARNSTHORNS WOOD, EFFINGHAM, SURREY—16th April 1960.

Leader: Mr. S. WAKELY.

In spite of a cold wind the woodlands were sheltered and a sunny day was much enjoyed. The wood was entered from the south-west corner, and the path followed led upwards until some cottages were reached. On the way, a number of galls were collected from the sallows in the hope that they would prove to be the work of *Aegeria flaviventris* Staud., but it was realised that some would be the work of the beetle *Saperda populnea* (L.). The search for larvae of *Parascotia fuliginaria* L. was not so successful as it had been on previous occasions, but a lot of log turning did bring to light a couple of small larvae, showing that this local species was still present.

After passing the cottages the party reached higher ground overlooking the Horsley road where it was decided to stop for lunch.

A single larva of *Limenitis camilla* L. was obtained by beating honeysuckle. Although small, it looked very healthy and others were sought, but without success. The party then proceeded eastwards and eventually reached the Effingham-Wisley road near a small caravan site in the woods. Hereabouts more galls were collected from the sallows.

Some of the rides were waterlogged and muddy boots were obtained by all who completed the circuit. Some large clumps of primroses were admired in parts of the wood and several of the party were surprised at both the extent of this wood and also at the entomological possibilities, together with the great variety of trees.

Birds noted included the Chiff-chaff, Willow-warbler, Whitethroat and Cuckoo, and a Blackbird's nest with two eggs was seen.

A coniferous tree with small cones which caused some interest was identified by Mr. T. R. Eagles as *Tsuga heterophylla* Sargent (Western Hemlock); and some nodular galls found growing on the roots of oak were those of the agamic form of *Biorhiza pallida* (Ol.). The insects emerging from these galls would be all females and would lay their eggs on the oak twigs and cause the familiar soft galls known as oak apples.

Lepidoptera seen included *Gonepteryx rhamni* L., *Aglais urticae* L., *Nymphalis io* L., and *Xylocampa areola* Esp.

The party numbered 14 and enjoyed a nice tea at the refreshment hut by the station.

STANFORD-LE-HOPE, ESSEX—23rd April 1960.

Leader: Mr. F. D. BUCK.

This locality, like most Thames estuary localities, requires good weather conditions if collecting is to be comfortable, and unfortunately the ten members composing the party had to work in chill, overcast, conditions with a steady east to north-east wind which persisted all day. The entire day was spent working the sea wall and marshes where the plentiful clumps of *Ballota nigra* L. received much attention. At the roots the beetle *Chrysolina banksi* (F.) was fairly plentiful, both imagines and larvae, and in the same situation the microlepidopterists found *Nemotois fasciella* F. larvae, in their fiddle-shaped cases, sparingly. On the leaves of the plant the case feeding larvae of *Coleophora lineola* Haw. were making conspicuous blotches where they had fed.

In thistle stems the larva of *Myelois cribrella* Hübn. was found, and the larva of *Arctia villica* L. with its characteristic red head was found whilst grubbing at the roots of various plants. *Lozopera beatricella* Wals. was taken in its larval form from the stems of *Conium maculatum* L. (Hemlock), whilst the cocoons of *Bucculatrix maritima* Staint. were common on *Aster tripolium* L. (Sea Aster).

Ostrinia (*Anania*) *nubilalis* Hübn. larvae were plentiful in the stems of *Artemisia vulgaris* L. (Mugwort), and *Philudoria potatoaria* L. was also reported.

A careful search of *Cardaria draba* (L.) Desv. produced a larva or two of the plutelid *Eidophasia messingiella* F.R. The beetle *Ceuthorrhynchus turbatus* Schultz, which we seldom fail to find here, was again in profusion on this plant, together with a few examples of *C. quadridens* Panz. and a single example of *C. contractus* Marsh.

A lepidopterous larva taken on ivy in the churchyard was subsequently determined as *Cacoecia pronubana* Hübn.

The coleopterists, who spent much of the day grubbing at the roots of plants, included amongst their captures *Brachinus crepitans* (L.), a species more often associated with chalk in the minds of coleopterists, but which occurs in several places along the Thames estuary. Other beetles taken in this situation were *Leistus ferrugineus* (L.), *Harpalus anxius* (Dufts.), *H. servus* (Dufts.), *Amara montivaga* Strum., *A. similata* (Gyll.), *Staphylinus ater* Grav., *Silpha tristis* Ill. and *Agriotes sputator* (L.); whilst two welcome captures in this way were *Nargus anisotomoides* (Spence) and *Hister purpurascens* Herbst.

Sweeping produced few beetles—*Micrambe villosa* (Heer), *Rhyzobius litura* (F.), *Cyphon padi* (L.), *Apion ulicis* (Forst.) and *A. tenue* Kirby.

Only three imagines of Lepidoptera were recorded, *Aglais urticae* L., *Orthosia gracilis* F. and *Depressaria alstroemeriana* Clerck.

Adders, slow-worms and lizards were seen and a single swallow was noted.

A brief visit was paid to the mill in the town just before catching the train home. On the window sills and in crevices *Attagenus pello* (L.) was found together with the larva of *Tenebrio molitor* L. and the Silver Fish Insect, *Lepisma saccharina* L.

OXSHOTT, SURREY—7th May 1960.

Leader: Mr. F. M. STRUTHERS.

A party of 11 members and friends met at the station and started collecting on the heather slopes nearby. It was a fine sunny day with little or no wind.

The moths *Saturnia pavonia* L., *Anarta myrtili* L., *Eupithecia nanata* Hübn., *Chiasmia clathrata* L., and *Gelechia betulea* Haw., were flying over the heather. The micros *Laspeyresia succedana* Schiff. (*ulicetana* Haw.) and *Grapholita internana* Guen., were flying round the gorse blossom, the former in large numbers. Larvae of *Phthorimaea fraternella* Dougl., were found in spun shoots on a large patch of *Stellaria media* (L.) Vill., which was growing at the foot of the slope.

The party made its way towards the Black Pond after lunch and the spring insects *Anthocharis cardamines* L., and *Pararge aegeria* L., were seen on the wing, also the hibernators *Nymphalis io* L., and *Gonepteryx rhamni* L. of which there was an abundance of males. Imagines of the hook tips *Drepana falcataria* L., and *D. lacertinaria* L. were seen, also *Cosymbia albipunctata* Hübn.

Larvae of *Achlya flavicornis* L. and *Eriocrania* and *Coleophora* species were collected from birch trees, galls of *Aegeria flaviventris* Staud. and *Laspeyresia servillana* Dup. were taken on salallows.

After an enjoyable day the party had tea at the hut near the station.

COSFORD MILL, SURREY—15th May 1960.

Leader: Mr. F. T. VALLINS.

Before a party of 27 members and friends assembled at the mill, heavy rain had fallen, but fortunately this soon ceased and the remainder of the day was fine though with a somewhat overcast sky. The herbage dried rapidly and conditions became very pleasant for collecting.

Ferns were growing in great abundance and variety and a spectacular clump of *Dryopteris borreeri* Newm. and a lovely cluster of *Athyrium filix-femina* (L.) Roth. with dark reddish rachis were admired.

From moss growing in a wet and sunny position in association with *Caltha palustris* L. (Marsh Marigold) the very small bug *Pachycoleus*



1



2



3

(1) Mr. F. Rumsey on the Rammore, Surrey, field Meeting, 28th May.

(2) Mr. Dennis Leston working for the bug *Pachycoleus rufescens* Sahl. at Cosford Mill, Surrey, 15th May.

(3) Messrs W. H. T. Tams (left) and S.N.A. Jacobs (right) at Cosford Mill, 15th May.

rufescens Sahl. (Hem., Crytostemmidae) was taken. It is believed that there exists an ecological connection between this bug and the Marsh Marigold (see communications, 11th August, p. 18).

Another extremely interesting find was cases of *Coleophora alnifoliae* Barasch, on alder which is a new record for Britain. Other cases found were those of *C. badiipenella* Dup. on elm and *C. politella* Scott, previously synonymized with *C. binderella* Kollar, on hazel or alder.

The Orange Tip butterfly, *Anthocharis* (*Euchloë*) *cardamines* L., was seen on the wing and its ova and larvae were taken plentifully. Three nests of young larvae of *Orthosia miniosa* Schiff., were also found.

By beating broom, good sized larvae of *Chesias legatella* Schiff., were taken. Two of these were of the yellow variety which feeds on the broom blossom to which it closely assimilates.

Other lepidopterous larvae taken were *Euproctis similis* Fuessl., *Dryobotodes eremita* F. (*protea* Schiff.), *Phycita spissicella* F., *Epinotia* (*Eucosma*) *sordidana* Hübn. and *Depressaria pulcherrimella* Staint. The last named is a very local species and only one larva was found on *Conopodium majus* (Gouan.) Lor. & Barr. (Earth Nut).

Imagines of *Euchoeca nebulata* Scop., were taken among the alders on which the larvae feed and *Adela viridella* Scop., was flying over the young oak trees.

The Alder Fly, *Sialis lutria* L. (Meg., Sialidae) was exceptionally abundant and clusters of its eggs were noted on alder leaves.

The following Coleoptera were taken: *Cyrtotriplax bipustulata* (F.), *Calvia quattuordecimguttata* (L.), *Pyrochroa serraticornis* (Scop.), *Phaedon cochleariae* (F.), *P. tumidulus* (Germ.), *Hydrothassa marginella* (L.), *Galerucella lineola* (F.), *Lochmaea capreae* (L.), *L. crataegi* (Forst.), *Phyllotreta vittula* (Redt.), *P. flexuosa* (Ill.), *Chalcoides aurata* (Marsh.), *Psylliodes hyoscyami* (L.), *Cassida viridis* L., *Apion aestivum* Germ., *Otiorrhynchus singularis* (L.), *Phyllobius pomaceus* Gyll. and *Curculio* (*Balanobius*) *salicivorus* Payk.

A delightful tea was provided in the mill by Mrs. Loarridge and her daughter, and the Society is once more most grateful and appreciative of the kindness extended to its members on these occasions.

WIMBLEDON COMMON, SURREY—22nd May 1960.

Leader: Mr. R. W. J. UFFEN.

In the Middle Ages Wimbledon Common formed part of the manor of Mortlake, belonging to the See of Canterbury. Later the area was divided among the multiplying adjacent parishes, and came under the manor of Wimbledon. Squabbles over the rights of lord and commoners in the nineteenth century almost led to the sale of the Common, which was eventually sold to the public under terms settled by Act of

Parliament in 1871. The area is now administered by a panel of eight honorary Conservators, five elected triennially by ratepayers, one appointed by the Home Secretary, one by the Secretary of State for War, and one by the Minister of Works. Maintenance is paid for out of a special rate levied on householders residing within three-quarters of a mile of the Common, the rate being halved in the outer quarter-mile zone. Some of the team of mounted and foot Rangers, who are kept busy policing the Common, live in some of the old farmhouses and cottages dotted over it.

By 1812, it is recorded, the Common was so despoiled that scarcely a tree was left of the woodland, which accounts for the absence of old oaks such as are found in Richmond Park. The woods on the western slopes towards the Beverley Brook have been replanted, but the gravelly, heathy plateau is to-day scourged by fires started mainly by malicious children who often come several miles for the purpose. Heather, young birch, gorse, and a few scrubby oaks are as far as the succession can get, despite the complete absence of grazing in recent years. To-day the bogs, formed where water accumulated in the gravel seeps cut across clay hollows, are largely spoilt for the naturalist by local drainage and dumping.

Eight members met at the Wimbledon corner of the heath in dull weather and made their way northwards until lunch, which was taken by the windmill, where there is still a large hay meadow. *Panemeria tenebrata* Scop. was taken here. During the morning, the day improved beyond hope and became very warm and sunny, and many insects were disturbed from the heath. Mallards were noted nesting a long way from the ponds in an effort to escape disturbance. Lizards and the tiger beetle *Cicindela campestris* L. were among the ground dwellers surviving the periodic burning and trampling of the heath. Other attractive beetles seen included *Clytus arietis* (L.), *Melolontha melolontha* (L.), and *Elater balteatus* L.

The afternoon was spent exploring the wooded slopes and beating for larvae, which were plentiful, but were for the most part, common defoliators. *Pseudoips prasinana* L. (*bicolorana* Fuessl.) larvae, and an imago of *Lobophora halterata* Hufn. were taken here. The Buckbean (*Menyanthes trifoliata* L.) was still to be found in Farm Bog. The collection of alien oaks around the war memorial near Stag Lane was inspected, and other examples of some species were noted in the woods. Included were: *Quercus palustris* Muench. (Pin Oak), *Q. maxima* (Marsh.) Aske (*rubra* Duroi nec L.) (Red Oak) and *Q. coccinea* (Scarlet Oak). A stark group of old Bedford Willows (*Salix alba* L. \times *fragilis* L. (*russelliana* Sm.)), cut right back to their ample trunks, made the leader wonder whether *Batrachedra praeangusta* Haw., which abounds on them later in the year, would survive.

Several examples of the fungus *Lactarius rufus* (Scop.) Fr. in perfect condition were noted under a birch tree in a spot where there were no pines. Other fungi were *Hypholoma fasciculare* (Huds.) Fr., *Pholiota*

praecox (Pers.) Fr., *Psathyrella gossypina* Bull. ex Fr., *P. obtusata* (Fr. sensu Lange) A. H. Smith.

Lepidoptera—imagines: *Lycaena phlaeas* L., few as yet; *Phlogophora meticulosa* L.; *Deilinia* (Cabrera) *pusaria* L.; *Aethalura punctulata* Schiff.; *Laodamia* (Dioryctria) *fusca* Haw.; *Laspeyresia succedana* Schiff., *Gelechia betulae* Haw. (*ericetella* Hübn.); *Glyphipterix fuscoviridella* Haw.; *Gracillaria alchimiella* Scop.; *Coleophora juncicolella* Staint., several; *Monopis rusticella* Hübn. on oak trunks with *Tinea parasitella* Hübn. and *T. cloacella* Haw. group; *Adela viridella* Scop.; *Bucculatrix ulmella* Zell.

Larvae: *Euproctis similis* Fuessl.; *Cosmia trapezina* L.; *Amphipyra pyramidea* L.; *Erannis marginaria* F.; *E. leucophaearia* Schiff.; *E. defoliaria* Clerck; *Colotois pennaria* L.; *Phigalia pilosaria* Schiff. (*pedaria* F.); *Operophtera brumata* L.; *Phycita spissicella* F.; *Aegeria respiformis* L. in living oak bark, at the junction with the sap-wood; *Acroclita naevana* Hübn. on holly; *Eucosma cruciana* L. and *Acleris hastiana* L. on *Salix repens* L.; *Tortrix viridana* L.; *Coleophora nemorum* Hein. (*ardeapennella* Scott) scarce on oak; *C. betulella* Hein. numerous on birch; *C. lutipennella* Zell.; *C. flavipennella* Dup.; *C. fuscadinella* Zell.; *C. genistae* Staint. plentiful on a few plants of *Genista anglica* L., near the Beverley Brook; and *Ypsolophus vittellus* L.

RANMORE, SURREY—28th May 1960.

Leader: Mr. B. GOATER.

The day was rather cool with a light north-east wind, and was cloudy with periods of sunshine. Eight members met at Boxhill Station and proceeded along the lane towards Ranmore. The main party turned left and worked up on to the bracken-clad top of the common, where *Hapalotis renustula* Hübn. was sought without success. Two others who became separated early on worked round via Tanner's Hatch and unfortunately failed to re-establish contact, though they later reported some interesting finds. After lunch the main party spent its time along the downs overlooking the Pilgrim's Way, and returned by way of the mixed woodland on the common.

Chelidonium majus L. occurs every year on the roadside by Boxhill station and appeared to be particularly abundant on this occasion. Further along the road luxuriant growths of the comfrey *Symphytum asperum* Leprech. were found in full bloom. It was noticed that *Prunus cerasifera* Ehrh. was being utilised in places as a roadside hedge. The colony of *Lathraea squamaria* L. growing amongst nettles under elm, and known for many years, was visited and found to be flourishing.

The day produced some interesting insect species of groups not often noticed on field meetings. One such was the flat, inactive, bark-like larva of the the local homopteron, *Ledra aurita* (L.) (Membracidae).

This is the largest British homopteron, and our only representative of the family. A snake-fly, *Agulla maculicollis* (Steph.), was beaten from oak, and *Chrysopa perla* (L.) and *Panorpa cognata* Rambur were in evidence. Sawflies associated with bracken on the top of the Common included *Strongylogaster lineata* (Christ.) and *Priophorus rarisipes* (Lepeletier) (*padi* auct. nec (L.)).

The following Lepidoptera were seen: (1) imagines: *Pieris napi* L., *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Pararge aegeria* L., *P. megera* L., *Coenonympha pamphilus* L., *Hamearis lucina* L., *Lycaena phlaeas* L., *Polyommatus icarus* Rott., *Lysandra bellargus* Rott. (quite common locally), *Pyrgus malvae* L., *Erynnis tages* L., *Drepana binaria* Hufn. (amongst oak), *D. cultraria* F. (amongst beech), *D. falcataria* L. (amongst birch), *Callimorpha jacobaeae* L., *Eilema sororcula* Hufn. (one beaten), *Phytometra viridaria* Clerck, *Euclidimera mi* Clerck, *Ectypa glyphica* L., *Scopula ornata* Scop., *Cosymbia linearia* Hübn., *Electrophaës corylata* Thunb., *Xanthorhoë spadicearia* Schiff., *X. montanata* Schiff., *Epirrhoë alternata* Müll., *Euphyia bilineata* L., *Ligdia adustata* Schiff., *Bapta bimaculata* F., *Pseudopanthera macularia* L., *Lithina chlorosata* Scop., (abundant in the bracken), *Ectropis consonaria* Hübn., *Ematurga atomaria* L., *Scoparia dubitalis* Hübn., *Pyrausta aurata* Schiff., *Crambus pascuellus* L., *Anthophila fabriciana* L. (over nettles), *Alucita baliodactylus* Zell., *Zygaena trifolii* Esp. (an interesting colony of small specimens), *Eulia ministrana* L., *Pardia cynosbatella* L., (beaten out of dog rose), *Glyphipterix fishcheriella* Zell. (common), *Coleophora olivacella* Staint. (one male, possibly a new county record), *C. nemorum* Heine (*ardeapennella* Scott) and *Micropterix thunbergella* F. (on sycamore flowers). (2) Larvae: *Quercusia (Thecla) quercus* L., *Pseudoips prasinana* L. (*bicolorana* Fuessl.), *Amphipyra pyramidea* L., *Cosmia trapezina* L., *Orthosia stabilis* Schiff., *Eupsilia transversa* Hufn., *Eupithecia abbreviata* Steph. (several beaten from oak), *Theria rupicaprararia* Schiff., *Erannis marginaria* F., *E. defoliaria* Clerck, *Colotois pennaria* L. (heavily parasitised), *Marasmarcha lunaedactyla* Haw. (on *Ononis*), *Alucita baliodactyla* Zell., (on *Origanum*), *Stomopteryx taeniolella* Zell. (in spun shoots of *Lotus*), *Coleophora albitarsella* Zell. (cases on *Origanum*), *C. binderella* Koll. or *C. politella* Scott (on *Corylus*—not reared), *Ypsolophus xylostellus* L. and *Y. nemorellus* L. (on *Lonicera*) and *Y. sequellus* Clerck (on *Acer campestre* L.).

EASHING, SURREY—4th June 1960.

Leader: Mr. R. W. J. UFFEN.

A party of less than ten was disappointing for the locality and the brilliant weather. All were primarily lepidopterists. The long list of species recorded contains remarkably few local species, but *Coleophora alnifoliae* Barasch was a notable, if expected find on the alders along

the Wey. The Cosford Mill meeting earlier, provided the first definite British record of this insect. A *Coleophora* feeding in a case made of several pieces of leaf was assumed to be *C. binderella* Koll., but was not reared.

Males of the cockroach *Ectobius lapponicus* (L.) were already mature and the beetle *Melolontha melolontha* (L.) was noted. Sweeping did not seem to produce the quantities of Diptera, Hemiptera and other groups usual here. Among the Heteroptera, *Coreus marginatus* (L.), *Eysarcoris punctatus* (L.) and *Laccostrephus fabricii* Kirkaldy, caught the eye. The lacewing *Chrysopa carnea* Steph. was in evidence.

Perhaps the most interesting observation was of numbers of the wasp-like hoverfly *Chrysotoxum cautum* (Harris) ovipositing at about 4 p.m. B.S.T. at random on the grass and other vegetation in a sunny hedge bottom. Females brought home unfortunately suffered from confinement on the hot journey home and died overnight. The larvae of the Chrysotoxinae are very little known.

Lepidoptera were reported as follows: *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Anthocharis cardamines* L., *Gonepteryx rhamni* L., *Polygonia c-album* L., *Aglais urticae* L., *Nymphalis io* L., *Pararge aegeria* L., *Coenonympha pamphilus* L., *Lycaena phlaeas* L., *Celastrina argiolus* L., *Polyommatus icarus* Rott., *Pyrgus malvae* L., *Erynnis tages* L., *Spilosoma lutea* Hufn., *Callimorpha jacobaeae* L., *Agrotis exclamationis* L., *Rivula sericealis* Scop., *Euclidimera mi* Clerck, *Ectypa glyphica* L., *Hemistola immaculata* Thunb., *Sterrhia trigeminata* Haw., *Calothysanis amata* L., *Xanthorhoe ferrugata* Clerck, *X. montanata* Schiff., *X. fluctuata* L., *Colostygia pectinataria* Knoch, *Euchoeca nebulata* Scop., *Epirrhoe alternata* Müll., *Melanthia procellata* Schiff., *Ligdia adustata* Schiff., *Deilinia* (Cabra) *pusaria* L., *Chiasmia clathrata* L., *Lithina chlorosata* Scop., *Phigalia pilosaria* Schiff. (pedaria F.) larvae, *Pseudobormia punctinalis* Scop., *Aethalura punctulata* Schiff., *Crambus pratellus* L., *C. hortuellus* Hübn., *Phalonia atricapitana* Steph., *Syndemis musculana* Hübn., *Pseudoargyrotoza conwagana* F., *Eulia ministrana* L., *Grapholita jungiella* L. (perlepidana Haw.), *Endothenia nigricostana* Haw., *Olethreutes lacunana* Schiff., *Anthophila fabriciana* L., *Fumaria casta* Fall. cases, *Oecophora geoffrella* L., *Depressaria applana* F., *D. angelicella* Hübn., *Glyphipterix fischeriella* Zell., *Elachista argentella* Clerck, *Coleophora badiipenella* Dup., larvae, *C. solitariella* Zell. larvae, *Adela fibulella* Schiff., *Micropterix calthella* L.

HAM STREET, KENT—12th June 1960.

Leader: Mr. J. M. CHALMERS-HUNT.

Altogether 15 people attended this meeting, which was held in conjunction with the Kent Field Club and, as usual, took place on the Forestry Commission property at Orlestone Woods.

The weather on this occasion was rather warm with some sunshine

at first, later however it clouded over, but the rain kept off, probably on account of the wind which was fairly strong.

Despite rapid deterioration of this entomological paradise, due to the planting of conifers, a number of the very local *Colobochyla salicalis* Schiff. were disturbed from among aspen saplings, but it is questionable how much longer this interesting species—now known from nowhere else in Britain—will survive under such changing conditions.

Other Lepidoptera noted included: *Clossiana (Argynnis) selene* Schiff., *Bena fagana* F. (*prasinana* L. auct. nec L.), *Lithacodia (Jaspidia) fasciana* L. (*pygarga* Hufn.), *Sterrrha trigeminata* Haw., *Stenoptilia bipunctidactyla* Scop., *Phalonia cnicana* Doubl., *Pammene germanana* Hübn., one, *Chlidonia baumanniana* Schiff., *Ptycholoma (Cacoccia) lecheana* L., *Ancylis lactana* F., *Gypsonoma dealbana* Fröl., of which both light and dark forms were numerous. Also the following larvae were reported: *Orthosia gracilis* Schiff., on *Potentilla erecta* (L.) Räusch.; *Harpyia bifida* Brahm, on sallow; *Colocasia coryli* L., on hornbeam.

A curious fact was that no one reported seeing the pretty white and black moth *Euphyia luctuata* Schiff. This species, whose larva feeds on *Chamaenerion angustifolium* (L.) Scop., was first noted in this locality in 1950, since when it has become increasingly numerous here as well as elsewhere in S.-E. England. It is interesting to note that prior to its appearance in these woods in 1950, the moth had only occurred twice before in Britain, i.e., c. 1925, in Essex and West Kent. It is possible, however, that this was an early year for it and that we were a little late.

Mr. J. L. Henderson has kindly supplied the following list of Coleoptera, all of which were either taken or seen by him: *Elatер elongatulus* F., *Otenicera (Corymbites) nigricornis* (Panz.), *Strangalia nigra* (L.), *Tetrops praeusta* (L.), *Saperda populnea* (L.), *Lagria atripes* (Muls.), *Apoderus coryli* (L.), *Caenorhinus tomentosus* (Gyll.), *Lasiornychites carifrons* (Gyll.), *Polydrusus flavipes* (Deg.), *Dorytomus tortrix* (L.), *D. dejeani* Faust, *D. rufatus* Bedel (*rufulus* Bedel), *Rhynchaenus pilosus* (F.), *R. stigma* Germ., *Ceuthorhynchus chrysanthemi* Germ., and many other commoner species. It is believed that *Strangalia nigra* (L.) may be a new record for this locality.

Mr. R. Ling kindly reported the following Diptera: *Tabanus bisignatus* Jaen. and *Dioctria baumhaueri* Meigen.

Tea was taken at the small teasshop in the village of Ham Street, thus bringing to an end an enjoyable day, which though certainly interesting, would doubtless have been more so had the wind been less strong.

CHATTENDEN, KENT—26th June 1960.

Leader: Mr. J. M. CHALMERS-HUNT.

For this meeting, another held in conjunction with the Kent Field Club, the day turned out to be fairly warm and sunny with not too

much wind. Some 12 people met at Cliffe Station and proceeded by car to Chattenden Woods, a locality seldom visited nowadays, though formerly considered one of the finest entomological hunting grounds in Britain.

The party entered the wood from the north-east and proceeded along a track to a field where the local *Lygephila pastinum* Treits. was found not uncommonly among its foodplant *Vicia cracca* L., much to the delight of a number of those present. In this particular field (which was completely surrounded by woodland) it was rather surprising to find a clump of *Typha latifolia* L., of which the stems contained larvae and pupae of *Nonagria typhae* Thunb. and the more local *N. sparganii* Esp.

In the wood itself and along the rides, many other species of Lepidoptera were noted, among which may be mentioned: *Fabriciana* (*Argynnis*) *cydippe* L., two; *Aphantopus hyperantus* L., male freshly out; *Macroglossum stellatarum* L., one; *Batodes angustiorana* Haw., *Argyrotoza bergmanniana* L.; *Endothenia gentianana* Hübn., *Batia lunaris* Haw., one; *Coleophora palliatella* Zinck., two cases on oak; *Lithocolletis cerasicolella* H.-S., pupa in mine in *Prunus avium* L., from which the imago emerged 30.vi.60; *Leucoptera spartifoliella* Hübn., cocoons abundant on *Sarothamnus scoparius* (L.) Wimmer.

PRINCES RISBOROUGH—19th June 1960.

Leader: Mr. F. G. SMITH.

On a gloriously sunny day, probably the last of this typical English summer, thirteen members and friends—met at the station by two cars—made their way to the little village of Cadsden, a charming spot on the scarp of the Chilterns.

In the morning, many interesting species, mainly microlepidoptera, were taken on the lower slopes of the hillside. *Pempelia dilutella* Hübn., *Oxyptilus parvidactyla* Haw., *Alucita tetradactyla* L., *Phalonia tesserana* Treits. and *Dichrorampha plumbogana* Scop. were among the commoner species taken, and Mr. S. Wakely took a single specimen of *Crambus dumetellus* Hübn., species probably overlooked because of its resemblance to the common *C. pratellus* L., which was also noted.

Lunch was taken in fine style at the Plough Inn, after which most of the party made a short excursion to the bottom of Coombe Hill, two miles away, where, five days prior to the meeting, the leader had noticed large numbers of *Adela croesella* Scop. performing their courtship flight over the privet bushes. Good luck was not with the party, however, and not a single specimen was seen. Mr. Wakely explained that while *A. croesella* flies in sunshine it also likes plenty of moisture. The day in question was extremely warm, without a cloud in the sky. Earlier in the week, when *A. croesella* was seen in large numbers, the day, although mainly sunny, became heavy at times with one or two heavy thunder-

storms, and it was shortly after one of these that the observation was made.

The trip was not entirely in vain, several *Ancyliis unculana* Haw., *Laspeyresia fagiglandana* Zell., and a single *Pancalia leuwenhoekella* L. being netted, and a dozen or so young larvae of *Saturnia pavonia* L. being found on *Rhamnus cathartica* L. (Buckthorn).

The remainder of the afternoon was spent back at Cadsden on the upper slopes among the juniper, but very little was added to the morning's list.

An enjoyable tea was taken at Fourbear House in Askett.

The following additional Lepidoptera were noted: *Polyommatus icarus* Rott., *Cupido minimus* Fuessl., *Agrotis exclamationis* L., *Orthosia gracilis* Schiff. larvae in spun shoots of lucerne, *Anaitis efformata* Guen., *Xanthorhoe montanata* Schiff., *Euphyia bilineata* L., *Pyrausta (Rhodaria) aurata* Schiff. larvae on marjoram, *Crambus perlellus* Scop., *Anthophila fabriciana* L., *Chlidonia subbaumanniana* Wilk., *Pseudargyrotoza conragana* F., *Endothenia gentianana* Hübn., *Celypha striana* Schiff., *Scythris senescens* Staint., *Ypsolophus scabrellus* L., one cocoon on hawthorn. One *Depressaria pimpinellae* Zell. from *Pimpinella saxifraga* L. (Burnet saxifrage) and a *Plutella porrectella* L. from several small larvae on rocket, were reared later.

The beetles *Dascillus cervinus* (L.) and *Oedemera lurida* (Marsh.) were recorded.

CHIDDINGFOLD, SURREY—2nd July 1960.

Leader: Mr. R. M. MERE.

Eighteen members and visitors attended this meeting which was favoured with a fine day. We were glad to have Mr. E. C. Pelham-Clinton from Edinburgh with us. Hog Wood, Ifold, was again visited.

Coleoptera were scarce, and nothing of note was found. Lepidoptera were not plentiful, but a fair number of species were recorded. Among the more interesting were *Limenitis camilla* L. in fair numbers, *Leptidea sinapis* L., *Sterrhia struminata* Borkh. (*inornata* Haw.), *Minoa murinata* Scop., *Ebulea (Psammodis) crocealis* Hübn., *Choristoneura diversana* Hübn., *Strophedra weirana* Dougl., and *Orthotaelia sparganella* Thunb., the last named being found as larva, pupa and imago.

There was a magnificent display of several species of *Hypericum* in flower.

Tea was kindly provided by Mrs. Mere at Mill House, Chiddingfold.

HAM STREET WOODS, KENT—10th July 1960.

Leader: Dr. E. SCOTT.

In spite of rain a party of nine enthusiasts met at 11 a.m. At first the square used as Forestry headquarters was explored. This area was

full of interesting plants and trees, including *Calluna vulgaris* (L.) Hull (Ling), *Aquilegia*, *Sarothamnus scoparius* (L.) Wimmer (Broom), *Quercus ilex* L. (Holm Oak), *Populus alba* L. (White Poplar) and most plants common in waste places. The Holm Oak was infested with mines of *Lithocolletis messaniella* Zell. *Senecio erucifolius* L. (Hoary Ragwort) produced larvae of *Callimorpha jacobaeae* L. and a brood of the local pyralid, *Homoeosoma cretaceella* Rössl. It was too wet at this time for insects to fly freely, but after lunch the rain stopped and the party explored a long ride in Fagg's Wood. Lepidoptera became readily disturbed, including a few common butterflies. Most of the moths were flushed from oak and hornbeam.

Other lepidoptera noted included: *Polygonia c-album* L., amongst which was a female ab. *hutchinsoni* Robson; *Aglais urticae* L.; *Melanargia galathea* L.; freshly emerged *Maniola jurtina* L.; *M. tithonus* L.; *Aphantopus hyperantus* L.; *Coenonympha pamphilus* L.; *Thymelicus sylvestris* Poda; *Ochlodes venata* Br. & Grey; *Cerura vinula* L., larvae; *Olostera pigra* Hufn., larvae; *Paradrina* (*Curadrina*) *clavipalpis* Scop.; *Laspeyria flexula* Schiff.; *Geometra* (*Hipparchus*) *papilionaria* L.; *Jodis lactearia* L.; *Sterrhia emarginata* L.; *Asthena albulata* Hufn.; *Lomaspilis marginata* L.; *Deilinia* (*Cabera*) *pusaria* L.; *Alcis* (*Cleora*) *repandata* L.; *Scoparia ambigualis* Treits.; *Psammotis crocealis* Hübn.; *Endotricha flammealis* Schiff.; *Crambus perlellus* Scop.; *Stenoptilia bipunctidactyla* Scop.; *Epagoge* (*Capua*) *grotiana* F.; *Archips* (*Cacoecia*) *oporana* L. (*podana* Scop.); *Aleimma* (*Tortrix*) *loeflingiana* L.; *Gypsonoma sociana* Haw.; *Zeiraphera* (*Eucosma*) *insertana* F. (*corticana* Hübn.); *Eucosma campoliana* Schiff. (*nigromaculana* Haw.); *Coleophora lutipennella* Zell.; *Argyresthia goedartella* L.; *Lithocolletis tenella* Zell., mines; *Leucoptera spartifoliella* Hübn., cocoons; *Tischeria marginea* Haw., mines.

After the meeting, tea was taken at the Duke's Head.

ALICE HOLT FOREST, HANTS—17th July 1960.

Leader: Dr. C. G. M. DE WORMS.

The day broke with a very wet and windy morning, but this did not deter quite a large number attending, until by afternoon the total reached 25, including a few members of the Alton Natural History Society and four boys from Lord Wandsworth College at Odiham with their master, Mr. S. Goodliffe. As on previous occasions, the route lay along the main ride through the forest, leading from Bentley station, where the party had assembled at 11.30 a.m. Fortunately, by then the sky had cleared a little and sunny periods occurred at intervals, though a high wind persisted.

Argynnis paphia L. soon made its appearance, together with a good number of *Limenitis camilla* L., most of which were past their best. There were also a few *Quercusia* (*Thecla*) *quercus* L. and *Celastrina*

argiolus L. about round the oaks and ash, while *Aphantopus hyperantus* L., *Maniola jurtina* L. and *Pararge aegeria* L. were really abundant.

Soon after mid-day the first *Apatura iris* L. was seen and by 2 p.m. this fine insect was to be seen in several parts of the forest, sailing round the oak tops sometimes in twos and threes, while a very large female was observed by one of the younger members at rest in a small tree and was eventually coaxed into the net. During the afternoon several *Lasiocampa quercus* L. were seen dashing over the undergrowth. After a picnic tea, the party broke up at about 5 p.m., after what proved to be a most enjoyable and profitable day.

OCKHAM, SURREY—23rd July 1960.

Leader: Mr. E. E. J. TRUNDELL

Seven members and friends attended this meeting. The weather was fine and warm, but cloudy all day; and as a consequence less than half a dozen butterflies were seen, and very few moths.

The micro-lepidopterists collected large quantities of curled and folded birch leaves in the hope of obtaining larvae of *Gracillaria populetorum* Zell., which had been taken in the locality. The most interesting record, however, was that of the beetle *Strangalia quadri-fasciata* (L.) taken by Mr. Wakeley.

A pleasant day was completed by tea, taken at the Station Café.

The more interesting Lepidoptera recorded are as follows: *Mittochrista miniata* Forst; *Abrostola* (*Unca*) *triplasia* L. (*tripartita* Hufn.), two larvae on *Acer campestre* L. (Maple); *Anarta myrtilli* L.; *Epiblemma* (*Eucosma*) *trigeminana* Steph. (*costipunctana* Haw.); *Dichrorampha* (*Hemimene*) *simpliciana* Haw.; *Mompha nodicolella* Fuchs, larval galls on *Chamaenerion angustifolium* (L.) Scop. (Rosebay Willowherb); *Paltodora cytisella* Curt., one taken on *Pteridium aquilinum* (L.) Kuhn. (Bracken); *Aristotelia ericinella* Dup., common on *Erica* (heather).

BOXLEY DOWNS, KENT—31st July 1960.

Leader: Mr. B. F. SKINNER.

Only two members joined several members of the Kent Field Club, under whose leadership they proceeded from 'The Cock', Detling, to Boxley Downs. The weather was warm and sunny for most of the day and there was little wind.

The area worked was typical chalk scrub bordered on one side by a beech wood. In spite of an abundance of flowering vegetation and, one would imagine, ideal conditions, insects were exceedingly scarce. This is exemplified by the appearance of only one *Polyommatus icarus* Rott. Other butterflies on the wing included: *Maniola jurtina* L.; *Ctenonympha pamphilus* L.; *Mesoacidalia* (*Argynnis*) *charlotta* Haw.

(*aglaia* L.), two only; *Nymphalis io* L.; *Pieris napi* L.; *Gonepteryx rhamni* L.; *Celastrina argiolus* L., one only; *Lycaena phlaeas* L. The moths on the wing included: *Ortholitha chenopodiata* L.; *O. bipunctaria* Schiff., one only; *Chiasmia clathrata* L., one only; *Aspitates gilvaria* Schiff., one only; *Plusia gamma* L.; *Nephoterix (Phycita) semirubella* Scop., one only; *Pyrausta (Rhodaria) purpuralis* L.; *Pyrausta (Rhodaria) aurata* Schiff.; *Pyrausta nigrata* Scop.; *Lozopera dilucidana* Steph.; *Ancylis upupana* Treits.; *Olethreutes rivulana* Scop.; *Argyresthia nitidella* F.; *Coleophora lizella* Zell.; *C. onosmella* Brahm; *Ypsolophus scabrellus* L. Empty mines of *Antispila pfeifferella* Hübner were noted on dogwood. Most of the moths were swept from dense yew and other bushes.

MICKLEHAM, SURREY—6th August 1960.

Leader: Mr. C. L. NISSEN.

The weather on this occasion was fine but generally cloudy, and although a little rain fell, this soon dispersed.

Four members joined the leader at Boxhill Station and the party made its way to Headley Lane by car, the day being spent in collecting on Mickleham Down and in the adjacent woodlands.

The following Lepidoptera were noted: *Pararge aegeria* L., *Aphantopus hyperantus* L., *Aglais urticae* L., *Nymphalis io* L., *Aricia agestis* Schiff., *Polyommatus icarus* Rott., *Celastrina argiolus* L., *Lycaena phlaeas* L., *Pieris napi* L., *Gonepteryx rhamni* L., *Thymelicus sylvestris* Poda., *Lygephila pastinum* Treits., *Anaitis plagiata* L., *Calothysanis amata* L., *Sterrhia biselata* Hufn., *Mesoleuca albicillata* L., *Zygaena filipendulae* L., *Pyrausta aurata* Schiff., *P. purpuralis* L., *Mesographe forficalis* L., *Stenoptilia pterodactyla* L., *Crambus culmellus* L., and *Olethreutes (Argyroplote) lacunana* Schiff. Larvae of *Callimorpha jacobaeae* L. were noted, also a heavily parasitized satyrid larva.

A pleasant tea was had afterwards at The Highway Café, Mickleham.

BOOKHAM COMMON, SURREY—14th August 1960.

Leader: Mr. DENNIS LESTON.

Bad weather limited the attendance. It was too wet for any serious collecting and the meeting dispersed early.

The walk across the plain from the station to the Isle of Wight pond was most enjoyable because the many flowering plants were fresh after the heavy rain. Perhaps the most noticeable species was *Achillea ptarmica* L. (Sneezewort), which seemed to be in greater profusion than in past years. Tangled masses of *Vicia tetrasperma* (L.) Schreb. (Smooth Tare) were everywhere. The white flowers and reddish seedheads of *Torilis japonica* (Houtt.) DC. (Upright Hedge-parsley) were conspicuous.

On the edge of the Isle of Wight pond the usual water plants were in abundance, particularly *Alisma plantago-aquatica* L. (Water-Plantain).

It being a wet season, some 20 species of fungi were noted. The genus *Russula* was well represented. At one spot under oaks there were about 50 examples of a large *Russula* with a red pileus and ochraceous gills. These were *Russula pseudo-integra* Arn. & Goris. According to Pearson (1950, *The Genus Russula*, Second and Revised Edition) this is a common species but it is not often recorded.

Where the wood had been cleared there were many species of mosses and a beautiful clump of the hepatic *Calypogeia trichomanis* (L.) Corda with clusters of light green gemmae.

HORSLEY, SURREY—20th August 1960.

Leader: Mr. T. R. EAGLES.

The party numbered ten and they were favoured with good weather. No rain fell during the meeting and there had been none for some hours before, so that the vegetation was dry. There was a good deal of sunshine.

As the cars were being parked near the church, a pair of *Celastrina argiolus* L. (Holly Blue Butterfly) were noticed on bramble blossom. Prompted by this, some of the party searched the ivy near by and found many eggs. These were laid "underneath" the clusters of flower buds, i.e., where the several pedicels of the flowers spring from the main stem. Some had hatched but in such cases the young larvae were on the same cluster of buds.

Larvae of *Cosymbia linearia* Hübn. (Lep., Geometridae) were beaten from beech, and a larva of *Sphinx ligustri* L. was found on *Viburnum lantana* L. A few imagines of *Lysandra coridon* Poda (both sexes) were seen.

Much attention was paid to micro-lepidoptera and larvae of the following species were collected: *Mompha terminella* Westw. on *Circaea lutetiana* L., *Acleris boscana* F. on elm, *Antispila treitschkiella* F.R. on *Cornus sanguinea* L., *Gracillaria tringipennella* Zell., on *Plantago lanceolata* L., *Leucoptera scitella* Zell. on *Crataegus monogyna* Jacq. (Hawthorn) and *Argyrotoza schalleriana* L. on *Viburnum lantana* L. Imagines taken were *Argyresthia semitestaceella* Curt., *Ypsolophus parenthesellus* L., *Microstega hyalinialis* Hübn., *Agriphila* (*Crambus*) *geniculea* Haw., *A. (C.) tristella* Schiff., *A. (C.) culmella* L., *Ancylis mitterbacheriana* Schiff., *Lathronympha strigana* F. (*hypericana* Hübn.) and *Pyrausta* (*Rhodaria*) *purpuralis* L.

A tall specimen of the introduced plant *Melilotus alba* Desr. (White Melilot) was noticed.

In the woods there was a fine display of fungus, and over 50 species were represented. Perhaps the most spectacular were the numerous fine examples of *Geaster triplex* Jungh. and groups of *Coprinus*

picaceus (Bull.) Fr. in beautiful condition. In one place about 20 specimens of *Clitocybe odora* (Bull.) Fr. were growing. There were many *Coprinus plicatilis* (Curt.) Fr.—some very large—and a great number of *Hypholoma velutinum* (Pers.) Fr.

Tea was taken at the Thatchers.

HIGHAM SALTINGS, KENT—27th August 1960.

Leader: Mr. E. E. J. TRUNDELL.

This meeting, held jointly with the Kent Field Club, was well attended, fourteen members and friends being present.

The party arrived on the collecting ground in a thunderstorm, but this lasted only a matter of minutes and the rest of the day was hot and sunny. Members who had travelled long distances to obtain specimens of *Evergestis extimalis* Scop. were well rewarded; the species occurred commonly on *Diplotaxis tenuifolia* (L.) DC. (Perennial Wall Rocket).

Butterflies were comparatively scarce, and in spite of the proximity of the locality to the Thames estuary no migrants were reported. One or two *Eumenis semele* L. were seen; a most unlikely setting for this species.

Botanists, lepidopterists and coleopterists reported an interesting day, and reports are awaited from arachnidists who had good finds on last year's meeting in this area.

When searching the stems of *Typha latifolia* L. (Great Reedmace) for lepidopterous pupae, members noticed small fungi growing low down on the decaying leaves. These were *Marasmius menieri* Boud. Other slightly larger fungi, *Pholiota mycenoides* Fr., were growing in the mud at the base of the plants. In the stems of *Typha latifolia* were found specimens of the large dark weevil *Notaris scirpi* (F.). Other Coleoptera noted were *Amara apricaria* (Payk.), *Agonum viduum* (Panz.), *Anacaena globulus* (Payk.), *Berosus affinis* Brullé, *Laccobius biguttatus* Gerh., *Oxytelus inustus* Grav., *Philonthus varians* (Payk.), *Staphylinus ater* Grav., *Quedius nemoralis* Baudi, *Q. rufipes* (Grav.), *Alianta incana* (Erich.), *Rybaxis longicornis* (Leach), *Anthocomus rufus* (Herbst), *Telmatophilus typhae* (Fall.), *Phalacrus fimetarius* Payk., *Corticaria impressa* (Oliv.), and *Rhizophorus litura* (F.). Fine plants were noted of the fairly local *Melilotus alba* Desr. (White Melilot), and amongst other interesting plants *Bupleurum tenuissimum* L. (Smallest Hare's ear) and *Spergularia marginata* (DC.) Kittel (Greater Sand Spurrey, were also noted.

Lepidoptera recorded included: *Smerinthus ocellata* L., larva on willows; *Nonagria typhae* Thunb., pupae in stems of *Typha latifolia* L.; *Rhizodra lutosus* Hübn., in roots of *Phragmites communis* Tren.; *Homoeosoma saxicola* Vaugh., larvae in flowers of *Senecio jacobaea* L.; *Calamotropha* (*Crambus*) *paludella* Hübn., one moth and an empty pupa case in stem of *Typha latifolia* L.; *Acleris* (*Peronea*) *hastiana* L.,

a few larvae on sallow; *Dichrorampha* (*Hemimene*) *simpliciana* Haw., flying among *Artemisia vulgaris* L.; *D. consortana* Steph., one taken; also larvae of *Callimorpha jacobaeae* L., were seen on two occasions to be feeding on *Tussilago farfara* L. (Colt's foot).

Tea was taken at the Checkers Inn.

NEWLANDS CORNER, SURREY—3rd September 1960.

Leader: Mr. S. WAKELY.

The party met at Clandon Station just after 11 a.m. and numbered 14, including members and friends. The weather was most unpleasant, and those who arrived by train were glad that two cars were available to convey them to the top of the downs at Newlands Corner. From here it was decided to work westwards along the edge of Merrow Down golf course, where some larvae of *Alispa angustella* Hübn. were found in the berries of *Euonymus europaeus* L. (Spindle). The wet herbage was rather against an intensive search, otherwise no doubt more would have been found. There were a few junipers (*Juniperus communis* L.) growing in one place, and larvae of *Thera juniperata* L. were taken by beating—not a pleasant task under such wet conditions, the beating trays soon becoming waterlogged. A single larva of *Abrostola* (*Unca*) *triplasia* L. (*tripartita* Hufn.) was also taken.

However, before 1 o'clock the rain ceased, the sun shone, and it was fine for the rest of the day. Retracing steps back to the top of the down, lunch was taken near the parked cars, after which the southern slope of the down was worked, back towards Weston Wood. A female *Gonepteryx rhamni* L. was netted, and worn *Lysandra coridon* Poda were still on the wing. The spindle bushes hereabouts were almost devoid of fruits and proved unrewarding in our search for more larvae. A solitary plant of Gromwell (*Lithospermum officinale* L.) was all we saw, so hopes of finding larvae of *Ethmia decemguttella* Hübn. vanished.

Several pupae of the local plume moth *Oidaematophorus carphodactylus* Hübn. were found in flowers of *Inula conyza* DC. About 30 species of fungus were noted. The one that attracted most admiration was a large example of *Amanita muscaria* (L.) Fr. (Fly Agaric) in perfect condition. Another pleasing find was a cluster of *Marasmius androsaceus* (L.) Fr. growing at the foot of one of the yew trees. The younger members found some handsomely coloured fungi belonging to the genus *Hygrophorus*—not many individuals but nevertheless four species were represented: *H. conicus* Fr., *H. nigrescens* Quel., *H. miniatus* Dr. and *H. chlorophanus* Fr.

At about 4.30 p.m. the party had tea at The Barn, after which the car owners conveyed us back to the station.

While waiting at Clandon Station for the train, several larvae of a very local tineid, *Gracillaria cuculipennella* Hübn., were found on a privet hedge nearby. A single moth was subsequently bred.

WHIPPENDELL WOOD, WATFORD, HERTS.—11th September 1960.

Leader: Mr. W. E. MINNION.

On a beautifully sunny day a party of twelve joined the leader at Watford Metropolitan Station. The marshy area west of Cassiobury Park, between the river and the canal, was visited. The route was then across the West Herts. Golf Course, via the magnificent row of limes to the wood. Here lunch was taken, and as the interests of those present were so varied, the party broke up, each to explore in his own way, arranging to meet again at the refreshment hut on the far side of the wood. The party returned to Watford at a leisurely pace to enable further collecting to be done.

The larvae of *Perizoma alchemillata* L. were swarming on *Galeopsis tetrahit* agg. A few larvae of *Cataplectica fulviguttella* Zell. were found in the seeds of *Angelica*, whilst larvae of *Scardia boleti* F. were common in fungi on large fallen trees. In the marshy area a fine growth of Orange Balsam (*Impatiens capensis* Meerburgh) and a good area of Butterbur (*Petasites hybridus* (L.) Gaertn.) were noted, but fungi were the main target of the botanists.

Over 60 species of fungi were noted. The first to be seen was an imposing cluster of *Lactarius vellereus* Fr., a large stoutly built white species. These were in the lime avenue. An intriguing little group of *Lycoperdon echinatum* Pers. was photographed, as also was a row of tufts of *Clavaria stricta* Pers. growing conveniently in a line on a piece of bark. For eating, there was a sufficient number of *Boletus elegans* (Schum.) Fr. and *B. scaber* (Bull.) Krombh. in good condition. Perhaps the most spectacular find was a large specimen of *Pleurotus palmatus* (Bull.) Fr. with a vivid pink pileus and pink gills. It was growing on timber stacked near the tea place.

TILGATE FOREST, SUSSEX—18th September 1960.

Leader: Mr. F. T. VALLINS.

A beautiful sunny day greeted the party of ten which assembled at Furnace Farm, the usual entrance to the forest from Three Bridges. They were met by a representative of the Forestry Commission, who very considerably provided an up-to-date map of the district and made a few useful suggestions. Unfortunately, he was unable to spend the day with the party.

The route taken was in the direction of the "Cinder Bridge" near the Balcombe Tunnel, but progress was rather slow, most members of the party finding much of interest on the way.

One of the first insects was the colourful froghopper *Graphocephala coccinea* (Forst.) (Hem. Tettigoniellidae), which is associated with rhododendrons. It was in exceptional abundance, as many as six being found on a single leaf.

In one part of the forest there were many fine plants of *Thelypteris oreopteris* (Ehrh.) C. Chr., (Mountain Fern). Fungi were in profusion, 73 species being listed. The more interesting were *Tricholoma bulbigerum* (A. & S.) Fr., *Lactarius flexuosus* Fr., *Cortinarius armillatus* Fr., and *Gomphidius rutilus* (Schaeff.) Fr. (*viscidus* (L.) Fr.). The last named is rarely seen on field meetings and one only was found on this occasion. There were plenty of edible species in good condition, such as *Cantherellus cibarius* Fr., *Boletus scaber* (Bull.) Krombh. and *B. versipellis* Fr.

Lepidoptera on the wing were very scarce but the following larvae were taken: *Plebejus argus* L., one found on heather; *Notodonta dromedarius* L., one on birch; *Phalera bucephala* L., on birch; *Colocasia coryli* L., on birch; *Ceramica pisi* L.; *Anarta myrtilli* L., on heather; *Cosymbia albipunctata* Hufn. (*pendularia* Clerck auct. nec Clerck), on birch; *Rheumaptera (Calocalpe) undulata* L., on willow; *Biston betularia* L., on birch; *Acleris (Peronea) ferrugana* Schiff. & Denis, larvae and pupae on birch; *A. (P.) hastiana* L., scarce on willow; *Telphusa notatella* Hübn., on willow; *T. proximella* Hübn., on birch; *Swammerdamia heroldella* Hübn., on birch, and one moth was taken; *Gracillaria betulicola* Hering, on birch and one moth was taken; *G. stigmatella* F., on willow; *Lyonetia clerckella* L., one pupa on an alder leaf; and *Tischeria complanella* Hübn., mines in oak leaves.

This is a rather strenuous meeting unless transport is obtained to Furnace Farm and it is necessary to take both lunch and tea, as there are no tea-rooms near the area visited. However, it is still a very promising district, despite the changes brought about by the Forestry Commission and the menace of Crawley New Town, which is rapidly skirting the northern edge of the forest.

ASHTEAD, SURREY—25th September 1960.

Leader: Mr. M. G. MORRIS.

The weather for this meeting was fine and warm, though the very heavy dew hampered collecting very early in the day. The ground between the station and the woods was worked in the morning and the woodland was explored in the afternoon. Insects were in good variety, some interesting species were taken and most of the eight members who attended had a good day.

Lepidopterous imagines were scarce, *Lycaena phlaeas* L. being almost the only one noted. Larvae were more abundant: "pug" larvae collected from the flower heads of *Senecio jacobaea* L. (Ragwort) were thought to be *Eupithecia centauriata* Schiff. and *E. absinthiata* Clerck. *Odontites verna* (Bell.) Dum. (Red Bartsia) was gathered for larvae of *Pericoma bifaciata* Haw. Beating hawthorn produced *Cilix glaucata* (Scop.), very small *Nola cucullatella* L. and a few *Gastropacha quercifolia* L. *Lygephila pastinum* Treits. was shaken from vetch. *Bena fagana*

F. (prasinana L. auct. nec L.) was beaten from oak. *Drepana lacertinaria* L., *Apatele tridens* Schiff., and *A. rumicis* L. were also taken. The larval cases of *Coleophora fuscocuprella* H.-S., *C. discordella* Zell., *C. troglodytella* Dup., *C. peribenanderi* Toll. (*therinella* Tengst. auctt. nec Tengst.), and *C. albicornuella* Bradley were found.

Few bugs were seen, only *Malacocoris chlorizans* (Panz.) and *Stenodema laevigatum* (L.) but *Deraeocoris* (*Camptobrochis*) *lutescens* (Schill.) was abundant on various trees.

The bright blue weevil *Rhynchites caeruleus* (Deg.) was not uncommonly beaten from various trees and specimens could be seen sitting on leaves of hawthorn and shining brightly in the sunshine. *Apion* spp. were very common on many trees, though almost absent from their foodplants beneath. *Apion craccae* (L.) was particularly abundant and *A. carduorum* Kirby, *A. loti* Kirby, *A. viciae* (Payk.), *A. ervi* Kirby, *A. dichroum* Bed., *A. nigritarse* Kirby, and *A. apricans* Herbst all occurred in numbers. *Apion ulicis* (Forst.) was in its usual abundance on *Ulex europaeus* L. (Furze) with some *Sitona humeralis* Steph.

A few specimens of the attractive *Xyphosia* (*Ictericia*) *westermanni* (Meig.) (Dipt., Trypetidae) were swept.

The following notes on fungi were kindly supplied by Mr. Eagles: "48 species were noted. True to its reputation the wood contained some magnificent specimens of *Fistulina hepatica* Fr. (Beef-steak fungus). These were on a fallen oak. On this there was also a beautiful patch of *Phlebia merismoides* Fr. The dominant species were *Lactarius quietus* Fr. and *L. mitissimus* Fr., and there were fine examples of *L. pyrogalus* (Bull.) Fr."

As tea could not be obtained, the party dispersed at about five p.m., having had an interesting day.

DRUID'S GROVE, DORKING, SURREY—1st October 1960.

Leader: Mr. T. R. EAGLES.

Rain was falling heavily when the party assembled at Boxhill Station. The attendance was five only, but this was not surprising in view of the bad weather forecast and accounts of flooding not 100 miles away.

After about 20 minutes the rain stopped and no more fell; indeed, the sun came out at times in the afternoon.

Near the station there is a low wall with masses of ivy blossom. Here members found a few full-fed larvae of *Celastrina argiolus* L. and one of *Acasis viretata* Hübn. On a higher wall nearby was a specimen of the plant *Hydrangea petiolaris* Sieb. and Zucc., a species which climbs as ivy does.

The rainwater had been shaken off the sycamore leaves and so they could be searched. Larvae of *Lithocolletis geniculella* Rag. were found in fair numbers. The colony of *Lithospermum officinale* L. (Gromwell) was

flourishing and the plants were adorned with the little hard white seeds from which it gets both its English and its scientific name. Larvae of *Ethmia decemguttella* Hübn. were found on the leaves.

Mosses were growing luxuriantly owing to the wet season, and the somewhat uncommon capsules of *Thamnium alopecurum* (Hedw.) B. & S. were noticed.

Fungi were plentiful in some parts but surprisingly scarce in others. The total number of species was 56. The beech woods in this area are well known for the earth star *Geaster triplex* Jungh. It was plentiful in places and some were very large. Only one *Geaster fornicatus* (Huds.) Fr. was seen.

Among beech leaves was found a large and beautiful example of *Tricholoma ionides* (Bull.) Fr. with blue cap and stem. Another pleasing find was a young *Cortinarius glaucopus* (Schaeff.) Fr. with characteristic bulbous base and blue gills.

OXSHOTT, SURREY—9th October 1960.

Leader: Dr. J. RAMSBOTTOM, O.B.E., M.A., D.SC., F.L.S.

A party of 14 attended. Mr. P. C. Holland, a visitor from the London Natural History Society, listed the species noted. There were two visitors from the Brighton Natural History Society. After a wet start the weather improved and the day was enjoyable. Fungus was abundant after the rains, and it was a great pleasure to find *Hydnum auriscalpium* (L.) Fr. growing on the fallen cones of Scots Pine. This interesting little fungus was known to occur at Oxshott but had not been seen for several years. Other noteworthy finds were *Gomphidius rutilus* (Schaeff.) Gr. (*viscidus* Fr.), *Clavaria argillacea* (Pers.) Fr. and *Leotia lubrica* Pers. Altogether 68 species were seen and these are listed hereunder.

The Lepidopterists reported *Drepana lacertinaria* L. (larvae on birch), *Swammerdamia heroldella* Hübn. (larvae on birch), *Ancyliis mitterbacheriana* Schiff. (larvae on oak) and *Lithocolletis mespilella* Hübn. (larvae in abundance on Mountain Ash). The only imagines seen were a few such as *Cirrhia icteritia* Hufn. and *Conistra vaccinii* L. which fell on the beating trays. Eggs of *Selenia tetralunaria* Hufn. were found. The lepidopterists took home some bolets for the pot.

The party enjoyed tea at the hut near the station.

List of fungi: *Amanita excelsa* Fr. (*spissa* Quel.), *A. muscaria* (L.) Fr., *A. rubescens* (Pers.) Fr., *Amanitopsis fulva* (Grev.) Rea, *Tricholoma fulvum* Fr., *Clitocybe aurantiaca* (Wulf.) Studer, *C. clavipes* (Pers.) Fr., *C. odora* (Bull) Fr., *C. vibecina* Fr., *Laccaria laccata* (Scop.) Cke., *L. amethystina* (Vaill.) Cke., *Mycena galopus* (Pers.) Fr., *M. epipterygia* (Scop.) Fr., *M. inclinata* Fr., *Collybia maculata* (A. & S.) Fr., *Marasmius androsaceus* (L.) Fr., *Omphalia maura* Fr., *Hygrophorus hypothejus* Fr., *Lactarius torminosus* Fr., *L. plumbeus* Fr. (*turpis* F.), *L. rufus* (Scop.) Fr., *L. theiogalus* Fr. non Bull., *Russula cyanoxantha*

(Schaeff.) Fr., *R. emetica* (Schaeff.) Fr., *R. ochroleuca* Fr., *Clitopilus prunulus* (Scop.) Fr., *Nolanea stauropora* Bres., *Hebeloma mesophaeum* (Pers.) Fr., *Flammula gummosa* (Lasch.) Quél., *F. sapinea* Fr., *Cortinarius semi-sanguineus* Gillet, *C. hinnuleus* Fr., *C. hemitrichus* (Pers.) Fr., *C. acutus* (Pers.) Fr., *Paxillus involutus* (Batsch.) Fr., *Hypholoma fasciculare* (Huds.) Fr., *H. capnoides* Fr., *H. hydrophilum* (Bull.) Fr., *Gomphidius rutilus* (Schaeff.) Fr. (*viscidus* Fr.), *Boletus luteus* (L.) Fr., *B. bovinus* (L.) Fr., *B. variegatus* (Swartz.) Fr., *B. badius* Fr., *B. holopus* Rostk., *B. versipellis* Fr., *Calocera viscosa* (Pers.) Fr., *Clavaria argillacea* (Pers.) Fr., *Claviceps purpurea* Tul., *Coryne sarcoides* (Jacq.) Tul., *Dacryomyces deliquescens* (Bull.) Duby., *Fomes annosus* Fr., *Hydnum auriscalpium* (L.) Fr., *Leotia lubrica* Pers., *Lycoperdon perlatum* Pers. (*gemmatum* Batsch.), *L. pyriforme* (Schaeff.) Pers., *Phlebia merismoides* Fr., *Polyporus perennis* (L.) Fr., *P. schweinitzii* Fr., *Polystictus versicolor* (L.) Fr., *Scleroderma aurantium* Pers., *Sparassis crispa* (Wulf.) Fr., *Sphaerobolus stellatus* (Tode) Pers., *Stereum sanguinolentum* (A. & S.) Fr., *S. hirsutum* (Willd.) Fr., *S. purpureum* (Pers.) Fr., *Xylaria hypoxylon* Grev., *Hypoxylon coccineum* Bull., and *Thelephora terrestris* (Ehrh.) Fr.

KNOLE PARK, SEVENOAKS, KENT—16th October 1960.

Leader: Professor C. T. INGOLD, D.S.C., PH.D., F.L.S.

The Society was invited to join the Kent Field Club's Fungus Foray. The contingent who accepted this kind invitation were greatly helped by our member, Miss Christine McDermott, who is treasurer of the Kent Field Club. She guided them by a short cut to the rendezvous and after the meeting showed the way across the park to the same short cut back to Sevenoaks. Last, but not least, she found a place where tea could be had.

It was a fine day with sun at times. The only rain was at the very end, as some of the party were nearing the station.

The leader is familiar with the micro-fungi. There is much fallen timber lying about in the Park and Professor Ingold was able to show and explain many species. It was a great treat to learn something in the field about this interesting group. Over 70 species of the larger fungi were noted. Special mention should be made of *Fomes fomentarius* (L.) Fr. This has been recorded from many places in the South of England but many such records are wrong. In fact, the species though common in the North of Scotland and on the Continent is rare in Southern England. Fine specimens were admired on one of the trees in the Park, possibly the only station for the species in the South. Both the generic and the specific names arise from the fact that in bygone days the dried fungus was much used as tinder. It caught the spark made by striking flint with steel.

Other species of note were *Cordyceps militaris* Fr. and *Rhizina inflata* (Schaeff.) Quél.

BUTTERFLY POPULATIONS ON THE NORTH DOWNS

By J. F. D. FRAZER

Read 8th September 1960.

I must at the start stress that this study has been carried out as part of the research programme of the Kent Field Club, and that a number of members of that Club have participated in it. In particular, a large amount of the field work has been done by Dr. G. A. N. Davis, Miss C. McDermott, and Messrs. A. M. Tynan, G. H. Morgan, E. G. Philp and C. Turner, so that the findings I wish to bring to your notice are in every sense the result of a joint effort and cannot be ascribed solely to any one person.

The investigation was originally undertaken in 1955 as a part of the ecological study of the fauna and flora of the Burham Down area of the North Downs which the Kent Field Club had decided to carry out. After two years' investigation of the insects in a small area of some seven acres near Burham village, the inquiry was extended to a further small area roughly two miles to the east along the same ridge of Downs. This was previously intended to be a possible alternative site which was easier of access, but it soon became apparent that certain differences between the results obtained on the two sites made it advisable to continue work simultaneously upon them both. Accordingly, population numbers have been investigated in both areas since the start of the 1957 season.

To our knowledge the only studies made in this country on the numbers in butterfly populations have been those by Dowdeswell, Fisher and Ford (1940, 1949) on the two species *Polyommatus icarus* Rott. and *Maniola jurtina* L. We originally attempted to extend our study to cover several species, and with that in mind, during the first season estimates were obtained for the numbers of five species of butterfly (three of these in one brood only); while individuals of two other species were marked, but insufficient numbers were recovered to give an adequate basis for computation (Frazer, McDermott, Morgan, Philp and Tynan, 1957). As it became apparent that the inclusion of so many species in our survey was putting too great a burden upon the workers as well as resulting in less accurate overall figures being obtained, it was decided to reduce the species investigated to two, one a lycaenid (*Lysandra coridon* Poda) and one a satyrid (*Maniola jurtina* L.), while also maintaining our watch on *Lysandra bellargus* Rott. in one of these two areas which it inhabited.

The method used was a slightly modified form of that described by Fisher and Ford (1947), and consisted of catching as many insects as possible over as long a period as possible, marking them on one wing with a quick-drying cellulose paint (using a different combination of colour and wing for each day), and keeping a careful note of the numbers captured on each day as well as of any recaptures. By this

means it is possible to estimate the numbers in the community as well as the average death rate in it during the period of observation.

Dowdeswell, Fisher and Ford (1949) have pointed out that the underside of the hind wings of *M. jurtina* may bear any numbers of black spots (with or without white pupils) between none and five. They have also shown that the mean number of spots visible differs between the two sexes, so that in most parts of southern England (Dowdeswell and Ford, 1952) the majority of males bear two spots and females show none at all. We have recorded our findings in this field also, and have extended this to cover the actual position of the spots on the wing. If one takes the potential series of spots from before backwards as a, b, c, d and e, then findings over the first two years (Frazer *et al.*, 1957) show that in both sexes spots b and d were far more likely to appear, spot c being the rarest. The findings in this field have now been extended to cover the period of five years, and the fact that the spots have been recorded from start to finish of the long period when the species is on the wing has helped to extract some new information.

In addition to this, note has been kept of any especial variation in the markings of the insects, and in particular of the occurrence of dwarf specimens (*minor* Leeds) of *M. jurtina* and of individuals of this species bearing albinistic patches on their wings.

TECHNIQUE

In working each piece of ground, butterflies were taken as evenly as possible over the whole area, marked with cellulose paint and released at once. Thus, insects were not removed any appreciable distance from their site of capture. At the same time, every precaution was taken to ensure that they were not damaged by handling (Dowdeswell, Fisher and Ford, 1949; Sheppard, 1951); we have already given reasons why we believe that the actual coloured mark applied is not disadvantageous to the individual (Frazer *et al.*, 1957). The day-to-day population numbers were worked out by the method devised by Fisher and Ford (1947) and explained in detail by Ford (1953), and the total population number was estimated by the method of Sheppard (quoted by Ford, 1953). These estimates give a true figure for the population number if there is no straying of individual insects to and from the experimental areas. In general there was felt to be sufficient of an ecological barrier around the two areas to prevent the spread of *L. coridon*, *L. bellargus* and *M. jurtina* (Frazer *et al.*, 1957) but a further investigation of the areas adjacent to the first area was undertaken in 1958, and showed no cause why the previous opinion should be altered.

The two areas investigated are isolated areas of downland. The first of these (area A) is above the village of Burham (National Grid Reference TQ 730626 for centre of the area). This consists of approximately seven acres of chalk grassland, roughly four times as long as it is broad, and faces south-east near the foot of the scarp face of the Downs. To the north and west this area is limited by a belt of tall

scrub (*Viburnum lantana* L. dominant), which is 50 yards or more thick and separates it from cultivated fields above. To the east it is separated by a path and some 20 yards of scrub from a much smaller area of downland which is the only chalk grassland lying within several hundred yards of it. A rough hedgerow and hayfield lie to the south of this area. The second area (area B) is a similar one of rough grass downland lying near the foot of Bluebell Hill between Chatham and Maidstone (Nat. Grid Ref. TQ 751608). This site also faces to the south-east, but is only approximately three acres in extent and is similarly isolated from all other suitable downland by roads, cultivated fields, houses and gardens.

The field notebooks used are available for consultation by interested workers at the Nature Conservancy, 19 Belgrave Square, London, S.W.1, where also the triangle diagrams and mathematical analyses from which the final figures have been derived can be seen.

RESULTS

The numbers of the three species of butterflies chiefly investigated have been shown to fluctuate markedly from year to year, the fluctuations in any one species being apparently independent of those in another. In particular, in area B *L. bellargus* diminished from a total of some 3,400 individuals in the first brood of 1956 to complete extinction in this area by 1959, despite the fact that in the same area *L. coridon* still remained present in considerable numbers.

In all three of the species investigated, the number of males in the population was found to exceed that of the females. It is to be recorded that in 1957 a deficiency in the observations has resulted in the appearance of blanks in the table.

Lysandra bellargus Rott.

Fluctuations in this species are shown in table 1.

TABLE 1

ESTIMATED NUMBERS OF *LYSANDRA BELLARGUS* ROTT. FLYING IN AREA B

	First Brood		Second Brood	
	♂	♀	♂	♀
1956	2,700	700	70	20
1957	100	25	25+	20+
1958	50?	5+	1	0
1959	0	0	0	0
1960	0	0	0	0

There was an explosive emergence in June, 1956 (Davis, Frazer and Tynan, 1958), but a rapid falling off in numbers thereafter. Searching on several occasions during 1959 and 1960 failed to show a single specimen in area B.

TABLE 2.
ESTIMATED NUMBERS of *LYSANDRA CORIDON* PODA AND *MANIOLA JURTINA* L. FLYING IN
AREAS A AND B BETWEEN 1955 AND 1959

	<i>L. coridon</i>				<i>M. jurtina</i>			
	Area A		Area B		Area A		Area B	
	♂	♀	♂	♀	♂	♀	♂	♀
1955	1,200	400	—	—	1,300	2,000	—	—
1956	1,100	500	—	—	4,400	1,200	—	—
1957	—	—	—	—	6,000	1,600	2,700	—
1958	5,100	400	1,500	800	1,400	800	1,500	1,100
1959	600	200	600	600	2,700	700	2,100	1,800
					15,800	6,300	3,600	2,900
							(excluding 1957)	

TABLE 3.

DAILY SURVIVAL RATES FOR *LYSANDRA CORIDON* PODA AND *MANIOLA JURTINA* L. IN THE
TWO EXPERIMENTAL AREAS, 1955-59.

A daily survival rate of, for example, 0.81 means that of the population flying on any one day, only 81% on average will survive to fly the next day.

	<i>L. coridon</i>				<i>M. jurtina</i>			
	Area A		Area B		Area A		Area B	
	♂	♀	♂	♀	♂	♀	♂	♀
1955	0.75	0.79	—	—	0.86	0.81	—	—
1956	0.78	0.55	0.86	0.81	0.84	0.80	—	—
1957	—	—	—	—	0.87	0.90	—	—
1958	0.77	0.77	0.84	0.81	0.89	0.92	0.87	0.82
1959	0.83	0.84	0.73	0.78	0.94	0.78	0.87	0.80

TABLE 4

Spotting on undersurface of hindwings of *Maniola jurtina* L., in Area A, 1955 to 1959 inclusive.
This includes the data already published by Creed *et al.* (1959).

Dates	Number of spots visible per wing in males						Spot Average	Number of spots visible per wing in females						Total	Spot Average
	0	1	2	3	4	5		0	1	2	3	4	5		
1955 { up to 23 July after 23 July	—	3	58	6	3	—	2.13	18	4	11	2	—	—	35	0.91
	5	15	110	5	—	1	1.88	208	36	19	2	—	—	265	0.30
1956 { up to 22 July 26 July-2 Aug. after 2 Aug.	4	36	308	92	18	3	2.20	48	15	20	4	—	—	87	0.77
	—	6	69	13	3	1	2.17	21	5	2	—	—	—	28	0.32
	4	7	82	1	1	—	1.87	105	29	14	3	1	—	152	0.46
1957 { up to 30 June 7 July-3 Aug.	2	15	256	73	23	6	2.31	27	6	15	5	—	—	53	0.96
	2	12	152	27	20	—	2.24	60	11	5	5	—	1	82	0.50
1958 { up to 20 July 25 July-6 Aug. 9 Aug.-24 Aug.	1	16	91	40	15	2	2.35	23	11	11	3	1	—	49	0.94
	—	6	45	10	5	2	2.30	11	5	3	2	—	1	22	1.0
	—	—	14	3	2	1	2.25	13	4	1	2	—	—	20	0.60
1959 { up to 22 July after 22 July	—	6	144	93	42	7	2.66	34	20	18	11	1	—	84	1.11
	—	2	9	1	—	1	2.15	10	5	3	—	—	—	18	0.61

Lysandra coridon Poda

Numbers of this species and of *M. jurtina* are given in table 2. In addition, the survival rate for both species is given in table 3.

Maniola jurtina L.

The results (see tables 2 and 3) are perhaps fuller for this species than for the other two, and also again there are marked fluctuations in numbers. The year 1957 is noted as a particularly good year for the species.

The spotting on the hind wings of *M. jurtina* has proved of extreme interest. It has been found in area A to vary between the first part of the emergence and the latter part, although there is no change in the spotting at area B throughout the whole season. The findings for 1955-57 in area A have been published by Creed, Dowdeswell, Ford and McWhirter (1959). These results are here supplemented by others in table 4.

The occurrence of major variations in the species examined has been remarkably infrequent. From 1957 to 1959 inclusive, a total of 2,200 *L. coridon* and 2,861 *M. jurtina* have been examined for such variation. One female of *L. coridon* with striate underside has been noted, but otherwise no variation has been apparent, other than a few ab. *arcuata* Courv. in either area and a few form *semisyngrapha* Tutt in area B in 1956. Among the *M. jurtina* figures in table 5 assessing the occurrence of bipupillate eyespots on the forewings, it will be seen that not only is there a much greater incidence of this variation in the female, but that the degree of occurrence of this form changes with the month of examination.

TABLE 5.

INCIDENCE OF BIPUPILLATE EYESPOTS IN FOREWING OF FEMALE *MANIOLA JURTIMA* L. FROM 1957 TO 1959.

		June	July	Aug. and Sept.	Total
1957	Number with bipupillate eyespots	11	16	5	32
	Total number of females checked	117	81	16	214
1958	Number with bipupillate eyespots	3	60	28	91
	Total number of females checked	11	147	72	230
1959	Number with bipupillate eyespots	11	28	14	53
	Total number of females checked	50	116	35	201
TOTALS	With bipupillate spots	25	104	47	176
	Number checked	178	344	123	645

Among some 2,216 males of *M. jurtina*, there were 12 with extra spotting on the forewings (ab. *excessa* Leeds), five dwarfs (ab. *minor* Leeds), 11 with albinotic patches on the wings, five bearing bipupillate discal spots on the forewings, and one with these spots "blind", i.e. not containing any white centre. Among 645 females of this species examined, there were 11 ab. *excessa*, one ab. *minor* and three with albinotic patches on the wings.

The totals of other species occurring in area A during the marking season of 1955 are given in table 6 (taken from Frazer *et al.*, 1957).

TABLE 6.

NUMBERS OF OTHER BUTTERFLY SPECIES ON AREA A IN 1955, WITH DAILY AVERAGE SURVIVAL RATE.

The figures for *Polyommatus icarus* Rott. refer only to the early part of the second brood.

	<i>C. pamphilus</i> (second brood)	<i>A. agestis</i>	<i>P. icarus</i>
Population numbers	500	700	♂ 430+ ♀ 300+
Daily survival rate	0.86	0.77	♂ 0.94 ♀ 0.93

DISCUSSION

The total disappearance of *L. bellargus* from area B in a matter of three years from its abundance there, stresses once again how little we know of the ecological factors which affect butterfly populations. It is well known that this species has become much scarcer of recent years yet it may still be found abundantly in some localities. It may be postulated that this disappearance is related to the way in which downland management by traditional grazing methods has declined. But even if such a relationship exists, we do not know the means by which the one affects the other. Area B has not been grazed for a number of years, apart from the slight effect of rabbits now that we are in the era of myxomatosis. Scrub is certainly invading it, but there is enough open grassland for both *M. jurtina* and for the allied species *L. coridon*, whose larvae utilise the same food plant as *L. bellargus*. Why has the latter species not been found on area A at all during this investigation, although *L. coridon* is plentiful there, and *L. bellargus* occurs within a few hundred yards of this area? Perhaps the clue is to be found in the sudden decline in numbers from the summer brood of 1955, so that the autumn brood contained only about a fortieth of these numbers.

Examination of table 1 suggests that some factor is interfering with the production of the second broods, whereas *L. coridon* on the same area has survived the winter to emerge successfully the following summer. This suggests a disease, parasite or predator which affects larvae,

pupae or the emerging insects. Since the allied *L. coridon* is not affected, this implies that the eggs are not attacked. Further, *L. coridon* emerges over a long period from mid-July, and in area B freshly emerged individuals of both sexes occur as late as early September, i.e. when *L. bellargus* of the second brood would normally emerge. This implies that neither pupae nor the newly emerged insects can be victims if one assumes that the same destroying agent would (given the opportunity) also attack *L. coridon*. The suggestion then is that the larval stage of *L. bellargus* is where it is vulnerable; further, since it is noticeable that the species is still plentiful on sites where the grazing regime is associated with grassland from which scrub is eliminated, the destruction caused to the larvae seems to be associated with the bushy undergrowth. Since small passerine birds occur equally in the presence or absence of scrub, presumably these are not destroying the larvae directly; but it may be that mice, voles or lizards (which are abundant in area B) are proving dangerous predators. What seems apparent is that some agency has been destroying larvae in July or August, but in the absence of any observational or experimental proof it would be dangerous to dogmatise further on the means by which such larval destruction is brought about.

The numbers of *L. coridon* have already been noted as fluctuating markedly from year to year, although in the female such fluctuation is not so great. One caveat must be entered when the figures in table 2 are studied. Females of *L. coridon* are not so conspicuous as males, and therefore may be overlooked more easily on the ground, so that it is not so simple to catch adequate numbers of them. Thus, if one works out the day-to-day totals, there may be a gap of a week or more when no estimated total can be inserted because no marked females have been taken. Thus, it is conceivable that there was a sudden rise in the female population during such a period, which went unnoticed by the investigating team; this does not seem likely, unless it were accompanied by an equally high death rate, but it is a possibility that must not be overlooked. During 1960 special efforts have been made to avoid any such gap, but the results of this season are not yet to hand. In general, the numbers of females are less than those of males, and in the great majority of cases there is one female to something between two and four males. While this fact, coupled with the general earlier emergence of the males, must be significant in contributing to the mating of most females, and so presumably aiding the survival of the species, it is not known how it is brought about. Presumably, either the eggs when laid are biased in number so that more potential males are present than females, or else there is greater loss of females before the imaginal stage is reached. In view of the number of eggs each female lays, loss of eggs, larvae and pupae must be enormous, so it seems probable that it is during these early stages when more females than males are lost; if this is the case, then this can account for the wide fluctuation found in the proportions between the two sexes among the adults.

Variations in the population of *M. jurtina* are equally large, but here again there appears to be a predominance of males. Once more, the reasons for this are not clear, but it is hoped to check these findings when the 1960 results are available. The variations in the markings as shown in table 4 are of extreme interest, since it is noticeable that the spotting of both sexes in area A changes gradually about halfway through the season, and this change is particularly marked in the female. This has subsequently been confirmed by further investigations elsewhere in Britain by Creed *et al.* (1959). They have suggested that this intra-seasonal shift in the degree of spotting might be one of the means by which changes in the stabilisation of spotting can come about. They have produced evidence to show that at Ipswich such a change took place at a time just before the whole emergence developed the new type of spotting which in earlier years had never been found during the latter part of the season. It may perhaps be suggested that the fact that the abnormal spotting only occurs in the latter part of the flight period, implies that the causative factor for this type of spotting must be associated with any factors concerned with lateness of emergence. The reason for this polymorphism is then found in the fact that presumably environmental differences favour the survival of one genetic type over the other. The differences appear not to be solely ones of temperature, since the effects are only brought about in area A and not in area B, so that apparently other ecological factors are playing a part in this.

At first sight, the daily death rate of the order of 10-25 per cent of the population (table 3) may seem rather large, but it must be remembered that this figure relates only to the mean rate. Thus, in 1957, the day-to-day survival rate in *L. coridon* from 26th August onwards in area B was 0.76 for males and 0.75 for females. This was, of course, at a period when the majority have been flying for some while, although fresh specimens of both sexes were still to be found. In contrast with this, in the early part of the season in the same locality, *M. jurtina* males were examined and a survival rate of 0.99 was found. This is in accordance with the fact that on occasion males of this insect have been taken as long as four weeks after they were marked. It should perhaps be emphasised that any variation in the mean survival rate at different parts of the season has been stated by Fisher to introduce a negligibly small error into estimates of population numbers (Ford, 1953).

Finally a factor of interest is the number of butterflies which a small acreage such as area A can support during one summer, as is shown partially in table 6. Apart from *Pararge megera* L. and *Aphantopus hyperantus* L. both of which were common in the area, the estimated adult satyrid population was of the order of 3,800 during July and August, excluding some migratory *Eumenis semele* L. In addition, other species whose larvae feed on grass in the area include at least three members of the HesperIIDae which are common there also: a minimal total of some 3,000 lycaenids were present on

the ground during the same summer. Although this points to the vast number of butterflies which a small area can support, some emphasis should be given to the fact that the level of insects present will vary from species to species and also from year to year. Thus, although *L. coridon* was equally common in area A during 1955 and 1956, the two other "Blues" abundant there in the first year (*Polyommatus icarus* Rott. and *Aricia agestis* Schiff.), were seen only in very small numbers in the area from 1956-58, although again having a good year in 1959. *P. megera* did well there from 1955-58, but was hardly seen in 1959 and 1960. Since no absolute figure has been attempted for the number of these species seen from year to year, it would not be proper to try to discuss here the factors concerned with their rapid changes in numbers, other than to point out that the numbers of the various species fluctuate independently, so that different sets of ecological factors must be involved in the various cases.

In conclusion, I should like to thank those who assisted in making this work possible, especially the owner of area A, who has kindly allowed us to work on it; also the members of the team, and particularly Dr. G. A. N. Davis, Miss C. McDermott and Messrs. A. M. Tynan, G. H. Morgan, E. G. Philp and C. Turner.

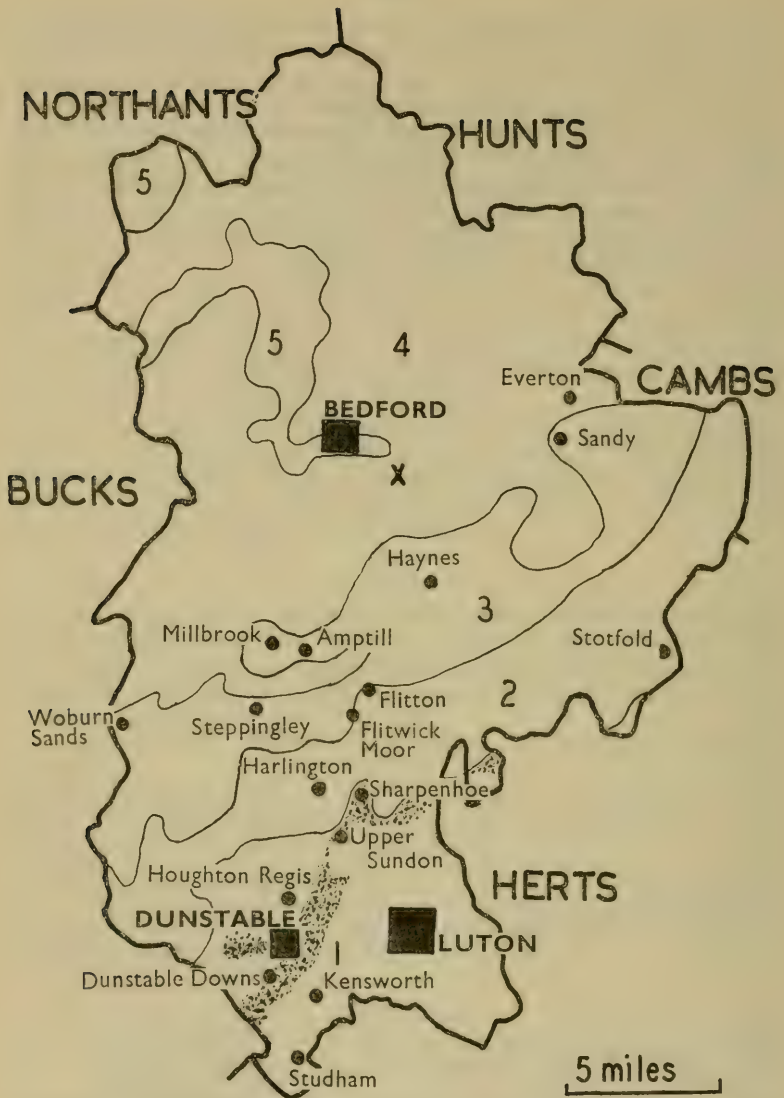
SUMMARY

1. A marking technique has been used to assess population numbers of various butterfly species in two localities over a period of five years.
2. During this period, *L. bellargus* has completely died out in this one locality (area B) apparently as a result of some unknown factor affecting the larvae.
3. Fluctuations are recorded in *M. jurtina* and *L. coridon* over the years.
4. In both species, males are more abundant than females.
5. The polymorphism of the spotting on the under surface of the hind wings of *M. jurtina* has been investigated.
6. Other species examined during one season were *P. icarus*, *A. agestis* and *Coenonympha pamphilus* L. It is stressed that violent fluctuations in the numbers of these have occurred, different ecological factors affecting different species.

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Map of Bedfordshire showing the five major zones and collecting points:

1. Chalk (stippled: chalk downs)
2. Gault clay
3. Lower Greensand
4. Oxford Clay
5. Lower Oolite

X marks position of the Cardington suction traps (Southwood, 1960) and tow-nets (Johnson and Southwood, 1949).

THE MIRIDAE (HEMIPTERA) OF BEDFORDSHIRE

By DENNIS LESTON, D.I.C.

The county list of Bedfordshire bugs is excellent not so much for the number of species recorded as for its documentation, based largely on papers by H. K. Airy Shaw (1945) and Bernard Verdcourt (1950). Bedwell (1945) introduced some species to the list but the tabular manner in which this was presented meant the absence of supporting data; the second edition of this list (Masse, 1955) contains a few omissions and carries over one dubiety in the Miridae. Requiring mirids for an investigation of internal anatomy (Leston, 1961), it was decided to collect them in the county; collecting was confined largely to some cool and wet afternoons in early and mid-August. Additional interest is centred on Bedfordshire in that it is at Cardington that experiments on trapping at heights have taken place (Johnson and Southwood, 1949; Southwood, 1960).

That there is a diminution in the number of species present as one goes north of the Thames or North Downs is probably true, but the northern limits of most southern forms are unknown. Buckinghamshire, at least in the south, has been well explored, but the relatively great north to south length of the county makes it an awkward unit to use in distributional studies. The Midland or south Midland limits of East Anglian species are also imprecise. In this context study of Bedfordshire insects assumes importance, though that three of the contiguous counties, Northants., Hunts., and Cambridgeshire—save for one or two classic spots in the last named—are poorly known to hemipterists is realised: however, Scudder (1956, 1957) has done a little to remedy the Northants. lacuna.

What makes Bedfordshire so interesting to those collectors and ecologists who have hitherto worked only in more southerly counties is its wonderfully varied geology; areas are present identical in stratification or similar in lithology to well known parts of Middlesex, Surrey or Kent: hence any differing features in the fauna may in general be ascribed to climatic factors (Chambers, 1949).

The present paper is conceived as the first of a series of studies on the counties of south or south-eastern England: others on Middlesex and Hertfordshire are in preparation. The aim is to map the distribution of the mirids found, and especially to confine the records to limited periods of time: to keep a bug in a county list, when it is elsewhere a common enough insect, on the fact of a capture or two made 70 years earlier is a practice which militates against the purpose of county lists, that is, as providing data for the zoogeographer in both the static and dynamic sense.

Below is given a list of the mirids captured, with brief field notes where these may have a bearing on distributional or life-cycle problems, together with a synopsis of earlier records. The list follows Southwood and Leston (1959) in nomenclature and enumeration; an asterisk denotes a species hitherto unrecorded for the county. Following this, notes are given on the mirids characteristic of each main geographical zone. A note on the unrecorded species concludes the study.

THE BEDFORDSHIRE MIRIDAE

BRYOCORINAE

225. *Monalocoris flicis* (L.) Coopers Hill, Ampthill, 6.viii.60, females only; Woburn Sands, 13.viii.60; previously recorded by Shaw (1945) and Verdcourt (1945, 1950). At Coopers Hill and Woburn Sands the bug occurred on bracken growing at the edges, or in clearings, of oak-birch and oak-pine woods on Lower Greensand.

DERAEOCORINAE

228. *Deraeocoris lutescens* (Schilling)*, Cooper's Hill, Ampthill, 6.viii.60, larvae on oak; Haynes, 8.viii.60, larvae on oak; Millbrook, 8.viii.60, larvae on elm; Stotfold, 17.viii.60, larvae on maple; Everton, 17.viii.60, adults on lime; Sandy, 17.viii.60, adults on oak. The examples collected to 8th August, all larvae, coincided with the capture of adults in Middlesex and South Herts. The absence of earlier records of this easily identified and now widespread insect may perhaps indicate a recent extension of range. Work on the testis follicles (Leston, 1961) suggests that the bug is dubiously congeneric with the next species.

229. *Deraeocoris ruber* (L.) Flitton, 3.viii.60; Flitwick Moor, 6.viii.60; Kensworth, 12.viii.60; previously recorded by Butler (1923); Shaw (1945) and Verdcourt (1944, 1950). Occurs chiefly amongst nettles, more abundantly where these grow in marshy places as at Flitton and Flitwick along the valley of the Flit; this partiality for damp localities is perhaps characteristic of the bug at its northern inland periphery.

PHYLINAE

The writer has not been in the field during the *Psallus* season, June and July; there are undoubtedly many of this genus to add to the list.

233. *Lopus decolor* (Fallén)* Woburn Sands, 13.viii.60; swept from thin grass at the edge of rides in an oak-birch-gorse locality—the date, and the considerable numbers collected, showed that the bug was at least ten days later than populations examined the same year on the Middx.-Herts. border around Boreham Wood, 28 miles to the south. Sandy, 17.viii.60, a singleton from grass in an oak-broom area.

234. *Oncotylus viridiflavus* (Goeze) Sharpenhoe, 4.viii.60, a female off hardheads growing on chalk; previously reported by Verdcourt (1950). Probably near the northern inland limit of the species.

233. *Hoplomachus thunbergi* (Fallén) Recorded by Shaw (1945) and Verdcourt (1950); their localities are both on the extension of the Chilterns into Beds., the host-plant being Mouse-Eared Hawkweed.

240. *Megalocoleus molliculus* (Fallén)* Ampthill Park, 3.viii.60, on Yarrow; Dunstable Downs, 20.viii.60, on Yarrow.

(242. *Amblytylus delicatus* (Perris) Recorded, without details, by Bedwell (1945). Dr. T. R. E. Southwood has tried unsuccessfully to trace the origin of this record; there are no specimens from this country in the Bedwell collection (Norwich City Museum), the Plant Pathology Laboratory, Harpenden, or in the British Museum (N.H.) collections, nor are there any further details in the Bedwell records (Dr. A. M. Masee) or in B. S. Williams' papers (C. Mackechnie Jarvis). Dr. P. Roche has informed him that he did not collect it. Under the circumstances, therefore, this record must be regarded as erroneous).

244. *Amblytylus nasutus* (Kirschbaum) Recorded by Masee (1955), no further details. This is near, apparently, to the bug's northern limit inland but it is abundant around Radlett, in south Herts.

245. *Macrotylus solitarius* (Meyer-Dür) Recorded by Verdcourt (1950).

246. *Macrotylus paykulli* (Fallén)* Dunstable Downs, 5.viii.54 (T. R. E. S.); Sharpenhoe, 4.viii.60; Upper Sundon, 8.viii.60. Abundant on Restharrow growing on chalk and probably distributed throughout the chalk downs.

247. *Orthonotus rufifrons* (Fallén)* Millbrook, 8.viii.60; Kensworth, 12.viii.60. On nettles in a damp woodland ride at the former and on nettles under elms at the western margins of fields at the latter; absent, apparently, from nettles growing in sunny places.

248. *Harpocera thoracica* (Fallén) Recorded by Verdcourt (1950); probably common but only taken by collecting between mid-May and very early June.

254. *Phylus coryli* (L.) Recorded by Masee (1955), no further details.

261. *Psallus variabilis* (Fallén) Recorded by Masee (1955) but more recent work (Woodroffe, 1957-8) has shown that almost all records are not, in fact, of this species. The specimens are probably *P. perrisi* Musant.

263. *Psallus roseus* (F.)* Flitton, 3.viii.60, a few, probably belated stragglers, on sallows in a marsh.

265. *Psallus lepidus* Fieber* Ampthill Park, 3.viii.60, a few on ash.

266. *Psallus falleni* Reuter Recorded by Verdcourt (1950).

271. *Psallus varians* (Herrich-Schaeffer) Recorded by Masee (1955), no details.

272. *Psallus obscurellus* (Fallén)* Sharpenhoe, 4.viii.60; Woburn Sands, 12.viii.60; common on Scots pine.

274. *Psallus salicellus* (Herrich-Schaeffer)* Woburn Sands, 13.viii.60, on bramble growing at the margins of rides in a pine-broom area.

275. *Atractotomus mali* (Meyer-Dür) Recorded by Massee (1955).

276. *Atractotomus magnicornis* (Fallén)* Woburn Sands, 13.viii.60, very common on spruce.

277. *Plagiognathus albipennis* (Fallén) Recorded by Bedwell (1945).

278. *Plagiognathus arbustorum* (F) Dunstable Downs, 2.vii.49; Flitton, 3.viii.60; Harlington, 4.viii.60; Sharpenhoe, 4.viii.60; Flitwick Moor, 6.viii.60; Kensworth, 12.viii.60; Studham, 12.viii.60; Sandy, 17.viii.60. Taken generally by sweeping nettles but often absent when these grew in shady woods. Also reported by Shaw (1945) and Verdcourt (1950).

279. *Plagiognathus chrysanthemi* (Wolff) Sharpenhoe, 4.viii.60; Ampthill Park, 3.viii.60; Dunstable Downs, 2.vii.49, 20.viii.60; also recorded by Shaw (1945). Found on many composites and other herbs, on chalk or sandy soils.

287. *Sthenarus roseri* (Herrich-Schaeffer) Flitton, 3.viii.60, sawflies; Sharpenhoe, 4.viii.60, White Willow; previously recorded by Scudder (1955) from willow. The Flitton and Sharpenhoe captures were of belated individuals, all female.

288. *Sthenarus rotermundi* Scholtz* Flitton, 3.viii.60. A few males, abundant females, on Grey Poplar in a marsh.

289. *Asciodema obsoletum* Fieber* Ampthill, 3.viii.60, scarce on gorse, females only; Sandy, 17.viii.60, two females on broom.

DICYPHINAE

295. *Macrolophus nubilis* (Herrich-Schaeffer) sensu stricto* Ampthill Park, 3.viii.60, a single female on Hedge Woundwort.

297. *Dicyphus epilobii* Reuter Flitton, 3.viii.60, on Great Hairy Willowherb; previously recorded by Verdcourt (1950).

298. *Dicyphus errans* (Wolff) Recorded by Massee (1955). The bug was not found in Beds. in August, 1960 and was very scarce in Herts. and Middx. at the same period.

299. *Dicyphus stachydis* Reuter Flitton, 3.viii.60, larvae and adults; Ampthill, 3.viii.60, larvae only; Kensworth, 12.viii.60, larvae only; Steppingley, 10.ix.60, adults only. At Kensworth a dozen or so larvae were taken in each sweep;; all were parasitised. Previously reported by Shaw (1945).

301. *Dicyphus annulatus* (Wolff) Sharpenhoe, 4.viii.60; Upper Sundon, 8.viii.60; recorded previously by Shaw (1945) from Totternhoe. All localities are on the chalk downs, where the host-plant, Restharrow, is abundant.

302. *Dicyphus globulifer* (Fallén) Ampthill Park, 3.viii.60; Sharpenhoe, 4.viii.60; Dunstable Downs, 20.viii.60, including larvae. On White Campion only, at all three localities. A male from Sharpenhoe was much darker than usual and had a red mite—six-legged stage—on each side of the dorsum of the abdomen, forcing the wings up.

These were identified by Mr. D. MacFarlane as *Metatrombidium poriceps* Oudemans, which is the larval stage of *Trombidium holocericeum* (L.). I am not aware of these epibionts having been reported from mirids before.

303. *Campyloneura virgula* (Herrich-Schaeffer) Amphill Park, 3.viii.60, on ash; Haynes, 8.viii.60, on oak; Woburn Sands, 13.viii.60, on oak; Kensworth, 20.viii.60, one on elm; also recorded by Verdcourt (1950). In my experience the bug, when found at the peak of its season—in 1960, mid-July in Herts. and Middlesex—occurs in greater numbers on ash rather than on oak; larvae are found some two weeks before those of *Pseudoloxops coccineus* are noted.

ORTHOTYLINAE

312. *Strongylocoris leucocephalus* (L.) Recorded from Dunstable Downs, 3.viii.49 by the writer (1950), the record overlooked by Massee (1955).

317. *Malacocoris chlorizans* (Panzer) Houghton Regis, 8.viii.60; Kensworth, 12.viii.60; Woburn Sands, 13.viii.60; Kensworth, 20.viii.60; on hazel, or trees adjacent to hazel, at all localities and frequent in hedgerows. Also recorded by Verdcourt (1950).

318. *Pieberocapsus flaveolus* (Reuter)* Dunstable Downs, 20.viii.60. Beneath grasses with tangled old roots growing on humus at the edge of a chalkpit; no marsh plants were present but some delphacid larvae were there. Two females, one male.

319. *Cyllocoris histrionicus* (L.) An early oak species, recorded by Verdcourt (1950).

320. *Dryophilocoris flavoquadrimaculatus* (Degeer) Another pre-August oak species, recorded by Shaw (1945) and Verdcourt (1950).

326. *Heterotoma merioptera* (Scopoli) Amphill Park, 3.viii.60; Harlington, 4.viii.60; Sharpenhoe, 4.viii.60; Millbrook, 8.viii.60; Kensworth, 12.viii.60; Woburn Sands, 13.viii.60. Common amidst rank vegetation, including nettles, and also ascends deciduous trees, including birch and hawthorn. Previously reported by Verdcourt (1950).

327. *Blepharidopterus angulatus* (Fallén) Flitwick Moor, 6.viii.60, abundant on alder; Houghton Regis, 8.viii.60; on maple; Kensworth, 12.viii.60, on elm and hazel; Everton, 17.viii.60, on lime; Kensworth, 20.viii.60, on elm. First recorded by Verdcourt (1950).

331. *Orthotylus viridinervis* (Kirschbaum)* Kensworth, 12.viii.60, on Wych Elm.

332. *Orthotylus marginalis* Reuter Flitton, 3.viii.60, females only. on sallow; Sharpenhoe, 4.viii.60, on White Willow. Also reported by Scudder (1955).

(333. *Orthotylus flavinervis* (Kirschbaum) Recorded by Shaw (1945), from sallows, and the record repeated by Massee (1955): the original report appeared before the revision of the genus by Southwood (1953) and, in view of the reported host, probably refers to *O. marginalis*. *O. flavinervis* is principally found on alder).

335. *Orthotylus nassatus* (F)* Kensworth, 12.viii.60, common on hazel.

336. *Orthotylus ochrotrichus* Fieber* Sharpenhoe, 4.viii.60, nettles at side of a wood; Kensworth, 12.viii.60, nettles in a woodland clearing; 20.viii.60, maple (but adjacent to elms and nettles).

337. *Orthotylus prasinus* (Fallén)* Houghton Regis, 8.viii.60, male and females on hazel (male genitalia checked); Millbrook, 8.viii.60, on elm, including a pair *in cop.* (genitalia checked); Sandy, 17.viii.60, females only, on elm.

338. *Orthotylus ericetorum* (Fallén) Coopers Hill, Amptill, 6.viii.60, larvae and adults under heather in a pure Callunetum. Previously recorded by Shaw (1945).

340. *Orthotylus virescens* (Douglas and Scott)* Millbrook, 8.viii.60; females only; Woburn Sands, 13.viii.60, females only; Sandy, 17.viii.60, one male, females abundant. Only taken on broom.

341. *Orthotylus concolor* (Kirschbaum)* Woburn Sands, 13.viii.60, a female on broom; Sandy, 17.viii.60, two females on broom. At the time of collecting *O. adenocarpi* (Perris), almost certainly present in the area, was probably over; *O. virescens* the dominant broom mirid (but males almost over), *O. concolor* infrequent. *Asciodema obsoletum* (see p. 114) was almost over but was found on both broom and gorse; *Phytocoris varipes* (see p. 119) also occurred sparingly on both hosts—but of course is not confined to these.

342. *Orthotylus flavosparsus* (Sahlberg) Sharpenhoe, 4.viii.60, on chenopod weeds in cornfield; Kensworth, 12.viii.60, on chenopod weeds in allotments; Dunstable Downs, 20.viii.60, on chenopod weeds in an old chalkpit; Steppingley, 10.ix.60, on primary colonising chenopods on newly made sandy clay ground. Also recorded by Verdcourt (1950) and from suction trap samples at Cardington by Southwood (1960).

346. *Pseudoloxops coccineus* (Meyer-Dür)* Amptill Park, 3.viii.60, a female on ash; Stotfold, 17.viii.60, a female on ash. Probably the peak of the season was in mid to late July.

347. *Cyrtorhinus caricis* Fallén) Flitwick Moor, 6.viii.60, amidst rushes (*Juncus* spp.) in a marsh.

349. *Mecomma ambulans* Fallén* Amptill Park, 3.viii.60, both sexes in a marsh; Flitwick Moor, 6.viii.60, both sexes in a marsh; Millbrook, 8.viii.60, females in rank vegetation in a Scots pine plantation.

350. *Mecomma dispar* (Bohemann)* Flitwick Moor, 6.viii.60, a male amidst marsh vegetation.

MIRINAE

352. *Pithanus maerkeli* (Herrich-Schaeffer) Dunstable Downs, 3.vii.49; Amptill Park, 3.viii.60, in grass in a marsh. Previously reported by Verdcourt (1950).

(355. *Lygus pratensis* (L.) *sensu stricto* Reported by Shaw (1945) and Verdcourt (1950) before the appearance of the various revisionary papers on the *Lygus* complex; the records almost certainly apply to one or other of the next two species).

356. *Lygus maritimus* Wagner* Coopers Hill, Ampthill, 6.viii.60, on gorse.

357. *Lygus rugulipennis* Poppius Flitton, 3.viii.60, docks; Upper Sundon, 8.viii.60, Scentless Mayweed; Studham, 12.viii.60, larvae and adults on Black Mullein; Dunstable Downs, 20.viii.60, docks; Steppingley, 10.ix.60, larvae and adults abundant on weeds of newly made sandy-clay ground. Previously recorded, as *Lygus pubescens* Reuter, by Verdcourt (1950) but the record was overlooked by Massee (1955); also taken in suction trap samples at Cardington (Southwood, 1960) and the records of Johnson and Southwood (1949) from tow-nets at Cardington, 22.viii.47 to 20.x.47, of *L. pratensis* (L.) are referable to this species.

358. *Liocoris tripustulatus* (F.) Flitton, 3.viii.60; Harlington, 4.viii.60; Millbrook, 8.viii.60; Woburn Sands, 13.viii.60; Dunstable Downs, 20.viii.60: on nettles almost everywhere these grow, larvae equally abundant with adults on the first two dates but scarcer later. Also recorded by Butler (1923), Johnson and Southwood (1949) and Verdcourt (1950).

360. *Orthops rubricatus* (Fallén)* Woburn Sands, 12.viii.60, two females on spruce in a plantation.

361. *Orthops cervinus* (Herrieh-Schaeffer) Flitton, 3.viii.60, a few on Grey Poplar; Haynes, 8.viii.60, abundant, including teneral, on ivy growing on oak trunks in an open position—must have bred on the site. First adults of the year were taken on 16.vii.60 in Middlesex; it is difficult to say whether the Haynes population was first generation or of a possible second. The first county record is that of Southwood (1960), from the Cardington suction traps, 2.x.53.

363. *Orthops campestris* (L.) Sharpenhoe, 4.viii.60; Steppingley, 10.ix.60; previously recorded by Shaw (1945), Southwood (1960) and Verdcourt (1945, 1950).

364. *Orthops kalmi* (L.) Recorded by Johnson and Southwood (1949) from Cardington tow-nets, 8.viii.47 and 27.viii.47, and by Verdcourt (1950) but the records overlooked by Massee (1955). The most abundant mirid in suction trap samples at Cardington in the period 22.ix. to 28.x.53 (Southwood, 1960).

365. *Lygocoris pabulinus* (L.) Sharpenhoe, 4.viii.60; Millbrook, 8.viii.60; on elm; Kensworth, 12.viii.60; Steppingley, 10.ix.60. Previously reported by Verdcourt (1950).

366. *Lygocoris viridis* (Fallén) Kensworth, 12.viii.60, on hazel.

368. *Lygocoris contaminatus* (Fallén)* Flitwick Moor, 6.viii.60, birch and alder; Beechwood Wood, Studham, 12.viii.60, birch, Woburn Sands, 13.viii.60, birch.

370. *Lygocoris lucorum* (Meyer-Dür) Upper Sundon, 8.viii.60; also recorded by Verdcourt (1950).

377. *Polymerus nigrinus* (Fallén) Recorded by Shaw (1945) and Verdcourt (1950).

378. *Charagochilus gyllenhalii* (Fallén)* Dunstable Downs, 20.viii.60; adults on, 5th instar larvae under, a bedstraw growing in a chalkpit.

381. *Miris striatus* (L.) Reported by Verdcourt (1950).

382. *Calocoris quadripunctatus* (Villiers) Reported by Verdcourt (1950).

383. *Calocoris sexguttatus* (F.) Recorded by Shaw (1945) and Verdcourt (1945, 1950).

384. *Calocoris fulvomaculatus* (Degeer) Recorded by Verdcourt (1950).

386. *Calocoris roseomaculatus* (Degeer) Recorded by Verdcourt (1950).

387. *Calocoris norvegicus* (Gmelin) Sharpenhoe, 4.viii.60; Kensworth, 12.viii.60; Studham, 12.viii.60; Dunstable Downs, 20.viii.60; previously recorded by Butler (1923), Shaw (1945), Southwood (1960) and Verdcourt (1945, 1950).

(T.R.E.S.); Sharpenhoe, 4.viii.60; previously recorded by Verdcourt (1950).

391. *Megacoelum infusum* (Herrich-Schaeffer) Coopers Hill, Ampt-hill, 6.viii.60; Haynes, 8.viii.60; Woburn Sands, 13.viii.60; Sandy, 17.viii.60: all captures of larvae, which were abundant on oak growing on sandy soil, but apparently absent from oak growing on clay—the four localities are spread right across the county on the Lower Greensand. Previously reported only from a single male in suction trap captures at Cardington, 23.viii.55 (Southwood, 1960): this locality is on the Oxford Clay a few miles north of the Lower Greensand belt.

392. *Megacoelum beckeri* (Fieber)* Millbrook, 8.viii.60, larvae on Scots pine; Woburn Sands, 13.viii.60, larvae and an adult on Scots pine. The localities are probably close to the present northern limit of the bug inland.

393. *Stenotus binotatus* (F.) Flitton, 3.viii.60; Sharpenhoe, 4.viii.60; Flitwick Moor, 6.viii.60; Kensworth, 12.viii.60; previously recorded by Shaw (1945) and Verdcourt (1950).

395. *Phytocoris tiliae* (F.) Harlington, 4.viii.60, elm; Houghton Regis, 8.viii.60, maple; Haynes, 8.viii.60, elm; Kensworth, 12.viii.60, elm; Woburn Sands, 13.viii.60, oak; Stotfold, 17.viii.60, maple; Kensworth, 20.viii.60, elm; the bug occurs on deciduous trees equally on chalk and on the Lower Greensand.

396. *Phytocoris populi* (L.) Beechwood Wood, Studham, 12.viii.60, oak; previously recorded by Verdcourt (1944, 1950).

397. *Phytocoris dimidiatus* Kirschbaum* Stotfold, 17.viii.60, one on oak. The bug is much more common in north-west London (Middx.).

398. *Phytocoris longipennis* Flor Kensworth, 20.viii.60, adults and larvae on maple; recorded by Verdcourt (1950).

399. *Phytocoris reuteri* Saunders Houghton Regis, 8.viii.60, on maple; the first county record is of two females from the Cardington suction traps, 23 and 25.viii.55 (Southwood, 1960).

401. *Phytocoris ulmi* (L.) Flitton, 3.viii.60; Harlington, 4.viii.60; Sharpenhoe, 4.viii.60; Houghton Regis, 8.viii.60. On hedgerow trees such as elm, maple and hawthorn, less common on trees of the heathy Lower Greensand. Previously recorded by Verdcourt (1950) but the record was overlooked by Massee (1955).

402. *Phytocoris varipes* Bohemann Sharpenhoe, 4.viii.60, in chalk scrub; Coopers Hill, Ampthill, 6.viii.60, beaten from gorse; Upper Sundon, 8.viii.60, swept from thick scrub in a disused chalkpit; Sandy, 17.viii.60, beaten from broom, common. Previously recorded by Verdcourt (1944, 1950). The male genitalia of all heath specimens were checked but no *P. insignis* Reuter were found; in view of the marked similarity of Coopers Hill to many of the Surrey heaths, the home of *insignis*, it may be that the apparent absence of *P. insignis* from Bedfordshire reflects a climatic barrier.

404. *Capsus ater* (L.) Flitton, 3.viii.60, in marsh vegetation; Cardington, 31.v.60, larvae only; previously recorded by Verdcourt (1945, 1950).

406. *Pantilius tunicatus* (F.) Recorded by Shaw (1945) and Verdcourt (1950).

411. *Stenodema calcaratum* (Fallén) Flitton, 3.viii.60; Flitwick Moor, 6.viii.60: both localities are marshy. Steppingley, 10.ix.60, roadside grasses. Previously recorded by Shaw (1945) and Verdcourt (1950).

413. *Stenodema laevigatum* (L.) Harlington, 4.viii.60; Kensworth, 12.viii.60; Studham, 12.viii.60; Sandy, 17.viii.60: the dominant bug in damp roadside verges. Previously recorded by Verdcourt (1944, 1950).

415. *Notostira elongata* (Geoffroy) Sharpenhoe, 4.viii.60; Harlington, 4.viii.60; Flitwick Moor, 6.viii.60; Steppingley, 10.ix.60, a single male only. Previously recorded by Verdcourt (1944, 1950).

416. *Megaloceraea recticornis* (Geoffroy) Flitton, 3.viii.60; Sharpenhoe, 4.viii.60; Flitwick Moor, 6.viii.60: in woodland clearings save on sandy soil, also in grass in hedgerows. Previously recorded by Verdcourt (1950).

418. *Trigonotylus ruficornis* (Geoffroy) Flitton, 3.viii.60; Sharpenhoe, 4.viii.60, thin grass on chalk; Sandy, 17.viii.60, fine grass on sand in an oak-broom area; Steppingley, 10.ix.60, grass on newly made sandy-clay ground. First reported from the Cardington suction trap 24.viii.55 (Southwood, 1960).

422. *Leptopterna ferrugata* (Fallén) Dunstable Downs, 3.vii.49; also recorded by Shaw (1945) and Verdcourt (1950).

423. *Leptopterna dolabrata* (L.) Flitton, 3.viii.60; recorded by Verdcourt (1944, 1950), the earlier report was overlooked by Massee (Bedwell, 1945).

COMMENTS ON THE LIST

The present study increases the number of mirids known to be present in the county by 27 species to a total of 94: four species reported before 1955 but overlooked by Massee (1955) are included in the

total as well as species added to the list by Scudder (1955) and Southwood (1960). Four names, *Amblytylus delicatus* (Perris), *Lygus pratensis*, (L.) *Orthotylus flavinervis* (Kirschbaum) and *Psallus variabilis* (Fallén), are deleted. All of the 94 species have been collected in the period 1944-1960, that is, within 17 years.

An admirable introduction to the study of insect distribution in Bedfordshire has been given by Chambers (1949); he recognises six main areas, separating the clay-with-flints drift area from the true chalk (here lumped together as zone 1—see map). The present study must be read in conjunction with Chambers.

The zones recognised, correspond to those of the solid geology (Chatwin, 1954) save that the small area of Corallian to the south west of Sandy is included in the Oxford Clay zone (zone 3): it is for the most part covered by the drift formations of the Ivel valley.

Zone 1: Chalk. This area is one of rolling low hills given up, in the main, to growing corn: much of the southern half is covered by a calcareous drift, the chalk-with-flints (Chatwin, 1954). On the drift the mirid fauna is not, as far as can be detected, differentiated from that of the London Clay of Herts. and Middlesex. The chalk scarp is locally steep at Dunstable Downs, around Upper Sundon, at Sharpenhoe (scenically and faunistically the best chalk area in the county) and the Barton Hills—this scarp, unlike the main Surrey one, faces north or north west but the artificial scarps of the many disused chalk-pits (notably around Upper Sundon) are varied both in direction and the degree of colonisation by plants. The land between Upper Sundon and Dunstable Downs abounds with chalk-pits—chalk is quarried for lime and cement manufactories. The characteristic chalk-down species include: *Hoplomachus thunbergi*, *Macrotylus paykulli*, *Dicyphus annulatus*, *Strangylocoris leucocephalus* and probably *Calcoris roseomaculatus*.

Zone 2: Gault Clay. Mirids of this belt are also found on the Oxford Clay and wherever humus or drift lies thick on the other areas, for example in hedgerows—which in this part of England are thick and often incorporate large examples of field maple, hawthorn, hazel, ash, oak and elm. The hedgerows carry a rich and varied *Phytocoris* fauna. Characteristic of the Gault clay are *Deraeocoris ruber* (especially in damp places), *Macrotylus solitarius*, *Orthonotus rufifrons*, *Phylus coryli*, *Psallus lepidus*, *Atractotomus mali*, *Dicyphus stachydis*, *Malacocoris chlorizans*, *Heterotoma merioptera*, *Orthotylus nassatus*, *Pseudoloxops coccineus*, *Pithanus maerkeli*, *Lygocoris pabulinus*, *L. viridis*, most *Phytocoris* spp. and *Capsus ater*. At its northern edge the clay merges into the Lower Greensand along the valley of the Flit, giving rise to a stretch of marsh at Flitton and Flitwick Moor; the latter is much altered by peat cutting in various stages of working or colonisation and shows mingling of marsh with bog conditions—an oak-birch wood interdigitates with alder-willow swamp and a large area of great reed-mace (*Typha latifolia* L.). Characteristic species here

include: *Psallus roseus*, *Sthenarus rotermundi* (probably not exclusively so), *Dicyphus epilobii*, *Orthotylus marginalis*, *Cyrtorhinus caricis*, *Mecomma ambulans* and *M. dispar*.

Zone 3: Lower Greensand. Here one meets gentle undulations with some steeper slopes, often in part man-made, at Sandy, Ampthill and Woburn Sands—the area includes some of the finest woodlands in Britain and incorporates magnificent tracts of landscape gardening at Woburn Park, Ampthill Park and Old Warden. The parklands alternate with treeless callunetums and modern coniferous plantations of Scots pine, larch and spruce; mixed oak-birch, oak-birch-pine and oak-hawthorn-broom localities abound, with grassy rides and clearings—on cuttings and old sand-pits gorse-broom areas are found. Mirids typical of the grassy clearings are *Lopus decolor* and *Trigonotylus ruficornis*; of the coniferous woods *Psallus obscurellus*, *Atractotomus magnicornis*, *Orthotylus rubricatus* and *Megacoelum beckeri*; of the oak-birch community *Psallus varians*, *Psallus salicellus*, *Lygocoris contaminatus*, *Megacoelum infusum* and probably a number of the early oak bugs not taken by the writer; of the heaths *Asciodema obsoletum*, *Orthotylus ericetorum*, *O. virescens* and *O. concolor*. In the east of the county much of the Lower Greensand is covered by alluvial drift, the market gardening area of the Lea Valley.

Zone 4: Oxford Clay. This Lower Oolitic area is less wooded than the Gault Clay but probably carries much the same mirid fauna; at Cardington, the Oxford Clay is covered by the alluvium of the Ouse Valley, while elsewhere, large tracts are covered by boulder clay. Zoologically the differences between superficial clays and the Oxford or Gault clays are probably unimportant. The large flooded workings of old brickfields give rise to lake-like conditions, but so far their margins have not been examined for mirids.

Zone 5: Lower Oolite. This small zone is a mixture of limestone and clay deposits, much of it, but not all, overlain by the alluvium or boulder clay of the Ouse Valley. It has not been sampled.

ABSENTEES

To discuss absentees is dangerous unless the reader bears in mind how little the county has been collected in comparison, say, with Kent, Surrey or southern Bucks. With that proviso we may now mention certain species not so far found.

Deracocoris olivaceus (F.) now occupies a triangle whose apex is north of Slough, Bucks., and basal angles at Whitley Common, Surrey and Epsom Common, Surrey (Leston and Woodroffe, 1961), this triangle covers parts of Bucks., Berks., Middx. and Surrey. The detectable spread is towards the south from a Thames Valley centre and the bug is unlikely to be found in Beds.

Alloecotomus gothicus (Fallén) was deliberately looked for and, if present, would have occurred on Scots pine in August: it is adjudged a true absentee. Although spreading from a Surrey centre the bug

has not, apparently, reached the Chilterns: it is reported from Suffolk but not Essex, Middx. or Herts. (Southwood and Leston, 1959).

Tinicephalus hortulanus (Meyer-Dür), its known distribution suggests, has probably been so far overlooked in the county, as has *Megalocoleus pilosus* (Schrank).. *Tytthus* spp. were searched for but probably overlooked; the absence of *Phylus melanocephalus* (L.) and many *Psallus* is almost certainly due to little early collecting.

Pilophorus spp. are the most interesting of the absentees; they were deliberately looked for throughout early August on Scots pine, sawallow and oak. Their absence, it is suggested, is probably a real one—they are rare in Herts. and Middx. and perhaps inland do not cross the Chilterns. *P. cinnamopterus* (Kirschbaum) is a common insect on pine, on the Bagshot Sands and Wealden Greensands south of the Thames, so its absence from the Lower Greensand of Bedfordshire must be ascribed to climatic factors; the same may be said for the oak species *P. perplexus* Douglas & Scott.

The absence of all but one of the Halticini is probably due to under-collecting, as is the absence of *Heterocordylus* spp. *Agnocoris reclusae* (Wagner) is so rarely caught in East Anglia that little can be said of it: it might be found around Flitwick Moor, which looks a suitable locality both for this and for *Capsus wagneri* Remane.

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THE ODONATA AND ORTHOPTEROID INSECTS OF WOOD WALTON FEN, HUNTINGDONSHIRE

By A. E. GARDNER, F.R.E.S.

Odonata

If we include the old records for *Aeshna isosceles* (Müll.) and *Sympetrum flaveolum* (L.) 26 species of Odonata have been recorded from Huntingdonshire. Of these, 17 species have been taken within the boundaries of the Fen.

Thanks to the industry of all concerned with the upkeep of Wood Walton Fen, the water level in the numerous dykes and drains is now maintained and the Odonata fauna continues to flourish. Of the species recorded from Huntingdonshire but not yet seen in the Fen we may expect to find *Aeshna juncea* (L.), *Libellula depressa* L., *Cordulia linæna* Fraser and *Sympetrum danae* (Sulz.). *Aeshna isosceles* (Müll.), *Libellula fulva* Müll., and *Lestes dryas* Kirby probably inhabited the area in the old fenland days. The occurrence of the not infrequent migrant *Sympetrum flaveolum* (L.) must remain a matter of chance.

Before listing the species recorded it is interesting to compare the Wood Walton fauna with that of Wicken Fen, Cambridgeshire. In this latter county, 26 species have been recorded, 19 of which have been seen in Wicken (Lucas, 1925 and 1928). Recorded from Wicken and not Wood Walton are *Aeshna juncea* (L.), *Orthetrum coerulescens* (F.), *Libellula depressa* L., *Sympetrum danae* (Sulz.), *Lestes dryas* Kirby and *Ceragrion tenellum* (de Vill.). From Wood Walton and not Wicken are recorded *Aeshna cyanea* (Müll.), *A. mixta* Lat., *Anax imperator* Leach and *Platynemis pennipes* (Pall.).

Except where specifically stated all the following species have been observed by the author. Sporadic visits were made from 1947 until 1958 when the Fen was visited monthly from April to November. The location numbers refer to those as used by Dr. E. Duffey (1957).

ANISOPTERA

AESHNIDAE

Brachytron pratense (Müll.)

A spring species flying from early May until the middle of July. Seen flying over the Great Raveley Drain and specimens taken in areas 92 and 93.

Aeshna cyanea (Müll.)

This summer species appears early in July and is often flying until mid October. Specimens have been seen in all parts, most common in the areas 80 and 92.

Aeshna mixta Lat.

Most plentiful at the end of August although it is on the wing from the end of July to the end of October. Odd specimens have been seen in the vicinity of the Great Raveley Drain where it was exceptionally common during September 1958. A regular immigrant which has become increasingly common in the south during about the last 20 years.

Aeshna grandis (L.)

Locally common in Huntingdonshire, this species is usually flying at the same time as *A. cyanea*. A few specimens are seen every year hawking along the oaks in the vicinity of the Bungalow (area 80). Often observed flying late in the evening until dusk.

Anax imperator Leach

Not seen by the author but there is a male in the British Museum (Nat. Hist.) taken in the Fen, 27.vii.39, at Tay Bridge. This fine species is rare in Huntingdonshire and has a long flying season extending from early June to the middle of August.

LIBELLULIDAE

Libellula quadrimaculata L.

This common and well known migrant is a spring and summer species. Specimens are seen most years over, and in the vicinity of the Great Raveley Drain.

Sympetrum striolatum (Charp.)

On the wing from late June to the end of October it is the common libelluline of the Fen and has been seen in all areas. During the exceptional summer of 1959 it was last seen on 15th November. Held by the male in tandem formation the normal method of oviposition is for the pair to fly slowly over the surface of the water dipping rhythmically for the female to wash off her eggs by slapping the surface with the tip of her abdomen. During this period of drought when little water remained in the dykes a number of females were observed ovipositing alone and by pushing the eggs into the moist peat some twelve inches above the water level.

The red species of *Sympetrum* are subject to little variation in colour pattern therefore it was of great interest to take a male *striolatum* on 18.x.59, flying alongside the drain bisecting area 79 which exhibited exceptional markings. (Fig. 1, on page 126).

Sympetrum striolatum (Charp.) ab. **masoni** ab. nov.

Male.—Abdomen 25 mm. Hind wing 27 mm. Head, thorax and abdominal segments one to six coloured as typical specimens. Abdominal segment seven with lateral mark heavily pigmented with black; eight with dorsal carina red, this flanked with a narrow black band for half the length of the segment then extending as a horizontal band to the ventral carina where it extends slightly towards the base; nine with dorsal and posterior carinae red, remainder black;



Fig. 1.—*Sympetrum s. striolatum* (Charp.) ab. *masoni* ab. nov. Lateral view of abdominal segments 7-10.

ten with dorsal carina and apical half red, basal half black; anal appendages red.

Wood Walton Fen, Huntingdonshire, 18.x.59, A. E. Gardner. Specimen in Gardner coll. I have pleasure in naming this aberration after Mr. G. Mason, the Warden.

Sympetrum sanguineum (Müll.)

A local southern species on the wing from the middle of July to early September. Not uncommon most years on the drain near the entrance to the Fen (5) and on the drains in areas 92 and 93.

ZYGOPTERA

AGRIIDAE

Agrion splendens (Harris)

Two males of this beautiful species were seen in 1947 by Mr. R. Mason flying over the Great Raveley Drain. Usually on the wing from the end of May to the middle of August it is common in the Midlands, breeding in quiet streams and canals with a muddy bottom. The Great Raveley Drain appears to be a most suitable habitat and it is hard to understand why this species is not more in evidence.

LESTIDAE

Lestes sponsa (Hanse.)

Very common and found in all areas although it seldom strays far from the reed beds. On the wing from early July to the middle or end of September.

PLATYCNEMIDIDAE

Platycnemis pennipes (Pall.)

Common flying over the Great Raveley Drain but not found far up the drains fed by it. This species prefers running water and is on the wing from early June to the middle of August.

COENAGRIIDAE

Pyrrhosoma nymphula (Sulz.)

This is one of the first species to gladden the heard of the Odonatist. It may, in good seasons, fly from the end of April until the middle of August. Found in all parts of the Fen where the larvae can survive in water with a low oxygen content.

Ischnura elegans (V. d. Lind)

This common species also has a long emergence period, being on the wing from the middle of May to the middle of September. Found along the Great Raveley Drain and in all parts of the Fen.

Erythromma najas (Hanse.)

This local species is common along the Great Raveley Drain but does not penetrate very far into the Fen. Usually on the wing from the end of May to early August.

Enallagma cyathigerum (Charp.)

Flying from the middle of May to early September, this common species is found in all areas.

Coenagrion puella (L.)

Flying at the same time as the preceding species, *puella* is equally common in all areas served by the drains.

Coenagrion pulchellum (V. d. Lind)

Less common than *C. puella* and on the wing from about the middle of May to early August. There is a single male in the British Museum (Nat. Hist.) taken in the Fen, 22-31.vii.39. I would expect it to occur along the Great Raveley Drain.

Orthopteroid Insects

Despite the rich fauna found in many of the other Orders, the Orthopteroid insects are poorly represented in Wood Walton. Only ten species can be accounted for, three of which appear to be new county records. These three are *Conocephalus dorsalis* (Lat.), *Platycleis denticulata* (Panz.) and *Meconema thalassinum* (Deg.)

DERMAPTERA

FORFICULIDAE

Forficula auricularia L.

The Common Earwig seems to be widely distributed although rarely met with. Usually beaten from sallow or oaks and rarely under sedge litter.

The Lesser Earwig, *Labia minor* (L.), recorded from Wicken ought to be met with in hot weather.

SALTATORIA

TETTIGONIIDAE

Meconema thalassinum (Deg.)

Several specimens beaten from oak and alder in areas 62 and 79. This species was found commonly during 1960 at the nearby Holm Fen.

Conocephalus dorsalis (Lat.)

Very common in the reed beds throughout the Fen. At night they become active and are often found on the lepidopterists' sugar patches.

Tettigonia viridissima L.

Dr. E. Duffey informs me that this fine insect has once been recorded. Lucas (1919) records the species from Ramsay.

Platycleis denticulata (Panz.)

During the late summer the adult insects are common on nettles and are often seen basking in the sunshine on the upturned boats at the entrance to the Fen. Specimens have also been swept in area 92.

TETRIGIDAE

Tetrix undulata (Sow.)

These little groundhoppers may easily be overlooked as they do not become adult until late in the year. During November 1960 several specimens were secured by the edge of Coleman's Drain.

Tetrix subulata (L.)

Two specimens of this marsh-loving species were obtained 14.v.61 at the edge of drain 5.

ACRIDIDAE

Omocestes viridulus (L.)

This widely distributed grasshopper has been found in long grass bordering the trees in areas 104 and 105.

Chorthippus brunneus Thunb.

Occasionally found near the entrance to the Fen and along the Main Drive.

Chorthippus parallelus (Zett.)

This very common species, like the preceding, has only been noted near the entrance although it is common outside the Fen.

Chorthippus albomarginatus (Deg.), a species not uncommon at Wicken, might well be found within the limits under survey.

ACKNOWLEDGMENTS

Grateful thanks are accorded to the Nature Conservancy for the facilities provided to carry out this survey and to Mr. R. Mason, the Warden, for much help and information.

To my colleague and fellow collector Mr. F. D. Buck I gratefully acknowledge his assistance in securing many specimens.

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LARVAE OF THE BRITISH LEPIDOPTERA NOT FIGURED BY BUCKLER

PART V

Compiled and illustrated by G. HAGGETT

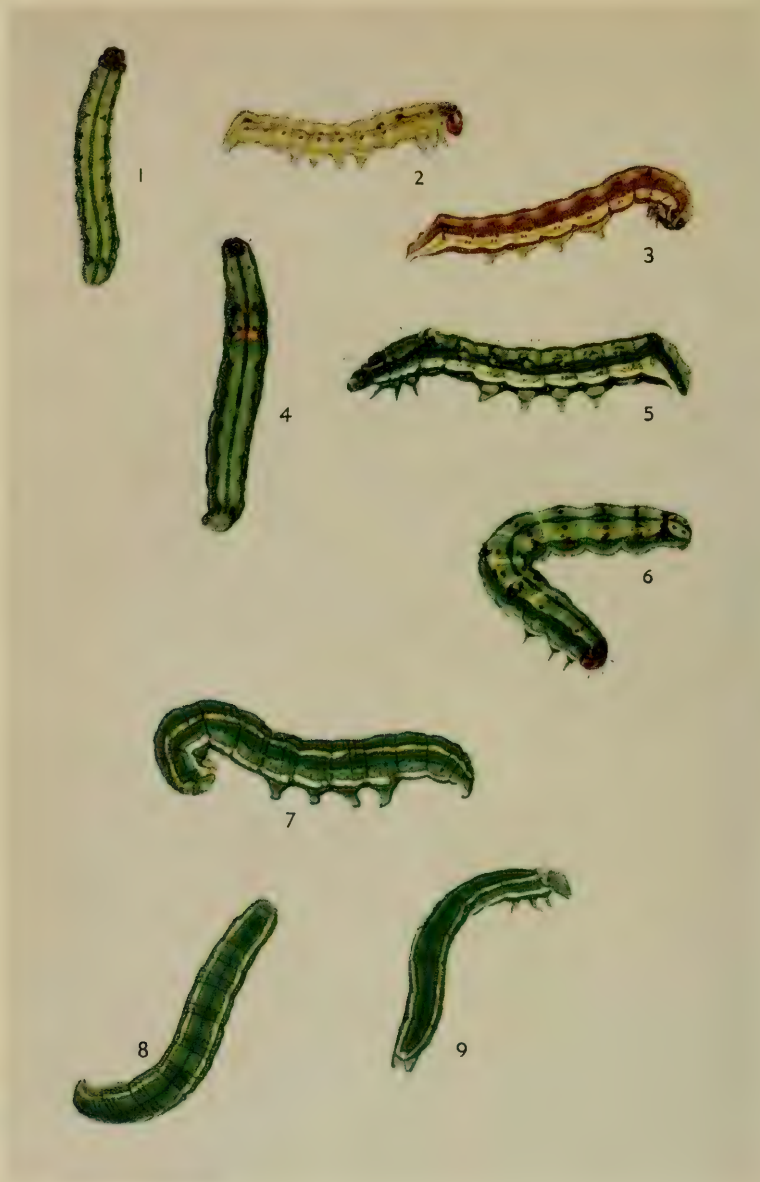
Heliothis armigera Hübn. Scarce Bordered Straw.

It had long been known that the larva of this species came to Britain as an accidental import in soft fruits from the Canary Islands and western Mediterranean lands; yet it is only in recent years that we have come to think of this as other than a rare happening and to suspect that most appearances of the moth, at least from November until May, may be due to it. The records of larvae being found in shipped fruit go back to the last century and were recalled by South, R. (1908, *Moths Brit. Isles*, 2: 52-53). That these introductions may take place regularly is indicated by the specimens found by E. W. Classey and his Feltham greengrocer who have had them over the years (1960, *Ent., Gaz.*, 11: 12). H. C. Huggins (1952, *Entomologist*, 85: 42) wrote of a similar experience, saying that his greengrocer had 20 or 30 larvae in 1950, and we can fairly suppose that if other merchants and shop workers were as enthusiastic in reporting them these records would be greatly multiplied.

The moth then, may appear in any neighbourhood where imported fruits are stored or sold. So far as the summer and autumnal records go they have occurred oddly in most years in the southern counties of England with others from Ireland and only a few from the north.

Abroad the species is at home only in warmer climates and there it may occur in such large numbers as to constitute a pest of agriculture. Barrett, C. G. (1900, *Lep. Brit. Isles*, 6: 153) gives a very full account of the habits abroad, but with a very poor figure of the larva (pl. 245, fig. 16). There is in Buckler, W. (1894, *Larvae of the Brit. Butterflies and Moths*, 6: 73) a good account by Tugwell of rearing the insect from the egg and of its cannibalism.

E. W. Classey has always been generous in helping me to obtain rare or little known lepidopterous larvae and I am glad to acknowledge my debt to him particularly with regard to *H. armigera* which he at last sent me alive after numerous postal disasters. I am pleased, too, to record my thanks to H. E. Hammond who had earlier given me details of imported larvae found in Birmingham and who also is a long-standing colleague in these matters. One of Mr. Hammond's larvae ate tomato and orange until the penultimate moult and then took to groundsel; those in my care have eaten only tomato and grapefruit. South and Barrett (*loc. cit.*) and Allan, P. B. M. (1949, *Larval Foodplants*, p. 73) each list the wide range of foods attacked by the larva and it seems that few kinds of plants will be rejected.



Figs. 1-6, *Heliiothis armigera* Hübn. ($\times 1\frac{1}{2}$ approx.)

Figs. 7-9, *Heliiothis maritima* Graslin s.sp. *septentrionalis* Hoff.
($\times 1\frac{1}{2}$ approx.)

Description of the fully grown larva. Length to 40 mm. There are two very differently coloured forms, a green one with dark suffusion and black patches and heavily developed dorsal tubercles, and a pale yellowish, or orange or purplish-brown form in which the tubercles are much smaller and less conspicuous.

The pattern is common to both forms. The narrow chain-like dorsal stripe is composed of double dark bowed lines that join at the beginning and end of each abdominal ring. The rest of the dorsum is occupied by narrow wriggling longitudinal lines that are expressed darker at the anterior half of each ring. There is a broad dark lateral band swept downwards on each segment that carries above and at the centre of each ring a patch of black striations which are heavily developed on the first two abdominal rings and again on the eighth and which are associated with large tubercles. Below the dark band there is a broader pale spiracular stripe which is better seen in the brown forms. Ventrally there is a broad pale broken central stripe. Head olive brown to ginger, much freckled on the lobes and clypeus. Prothoracic plate smooth, shining, densely black mottled, the dorsal line rather darker, crossed by broken white subdorsals which continue only to the first abdominal ring. Anal plate weak and crossed by the double dorsal line. Prothoracic legs green or brown; prolegs green or brown each with a clear white streak ventrally in front. Spiracles oval, thickly ringed in black, those of the eighth abdominal ring very large. All tubercles lightly raised, shining black and round, the dorsals becoming oval and twice the size of the rest at the first, second and eighth abdominal rings; each tubercle supports a stiff short dark bristle.

Shape cylindrical, humped at the first abdominal and eighth abdominal segments, the head held well into the thorax at rest and beneath the rather hood-like plate. The skin bears the dense minute spiny projections that distinguish the *Heliothis* larva.

The green form is a lovely velvety sap tint that darkens above almost to olive. Intersegmental folds narrowly yellow tinged when contorted. On the first two and eighth abdominal rings the dark lateral band merges into suffused black patches which in their turn are joined to the enlarged dorsal trapezoidal tubercle; the short black striations of each patch stand on a clear yellow base and there is an associated bright orange spot placed immediately below, in the lateral band. There is a crisp narrow white flange on all segments at the lower edge of the broad spiracular band which is itself edged below in contrastingly dark green and especially at the intersegmental divisions. Just as other characters of the green larva become darkened and more strongly developed, so the four tubercles of the last segment are large and deep black.

The brown forms are remarkable in that their tubercles are slighter and the patches associated with the lateral band are comprised of ill-developed black lines. By contrast, however, the broad spiracular band shows up pale primrose yellow, touched with vermilion at the

centre of each ring, and here the pair of small tubercles that accompanies each abdominal spiracle stands out black and clear.

Figures—Pl. III, figs. 1-6, immediately after the last moult, 21.iv.57; figs. 3 and 5, fully grown, 12.xii.59 and 25.xii.59; fig. 6, from a colour transparency by J. Bradley, xii.59, the same larva. All from larvae in tomatoes imported from Canary Is., found at Feltham, Middlesex, E. W. Classey.

Heliothis maritima Graslin s.sp. *septentrionalis* Hoffmeyer.
Shoulder Striped Clover.

Amongst the numerous twin species separated in recent times from what had formerly passed as one species, *H. maritima* is one of the few whose separation is supported by differences in biology and ecology. For not only are there evident differences between the moths and larvae of *H. maritima* and *H. virescens* Hüfn. (*dipsacea* L.) but the two occur in the contrasted habitats of acid heathland and alkaline soils respectively, and never the two on the same ground. Dr. de Worms' supposition (1939, *Entomologist*, 72: 132) that "... *H. maritima* was confined to the southern counties, while *H. virescens* had the eastern area as its headquarters" has proved correct.

H. maritima has a very restricted distribution in Britain, being confined to the larger heathlands of Surrey, Hampshire and Dorsetshire; amongst the better known localities are Horsell and Chobham Commons, Studland and Wareham Heaths, Parley Cross and the extensive heather lands of the New Forest. Even here the insect may by no means be present in all parts of its district but it is not confined to the wetter hollows as was once thought.

The moths fly in June and July, once recorded as late as 1st September. Larvae may in some years (like 1958) be still numerous by the end of September while in others the bulk may have gone down by the first week of that month.

In the wild larvae seem to eat the flowers of *Calluna* as readily as those of *Erica*, while Kettlewell found some also on Bog Asphodel seed heads. In captivity they take readily to runner beans.

The larva was first discovered in Britain by Dr. H. B. D. Kettlewell in 1957, recorded by him in 1958, (*Entomologist*, 91: 27), and was described by the present writer on page 30. Since publishing the description of the pupa (*Ibid.*, 91: 30) I have seen a good many living pupae of both species and have had both available for comparison at the same moment. *H. maritima* is much the more slender, its wing cases the more translucent green and the medio-dorsal stripe darker and bolder. Indeed, the differences between the two are rather greater than might be expected.

H. m. maritima is not known from Britain, although the Dungeness form of *H. virescens* sometimes may look very like it. Hy. J. Turner discussed the three insects in *Proc. S. Lond. ent. nat. Hist. Soc.*, 1938-39: 110 (1939).

Description of the last instar larva. Length to 33 mm. In shape rather slender and cylindrical, flattened along the dorsum and with considerable taper at the 11th segment. The skin soft and velvety due to a complete covering of the short backwardly directed spines that are a feature of this genus (and of *Pyrria*). There is little yellow folding of the skin between segments so the larva has a firm, uniform appearance however its movements.

Colour a deep velvety olive green shading lighter at the sides. Dorsal stripe an obscure darker green, very finely centred by a weak and broken whitish line and edged by a similarly broken pale border, the stripe barely perceptible on the thorax and ending immediately before the anal plate. Subdorsals very clear, pale yellow, arched but slightly above on each segment, continuous from the prothoracic plate on to the anal plate where they meet at its posterior margin, and bordered throughout with darker green below. Subspiracular bands a little broader and bolder than the subdorsals, clear white and sinuous, continuous from the prothorax to the sides of the anal claspers, slightly curved downwards on each segment. The lateral space between the subdorsals and subspriculars is evenly divided into darker green above and more yellowish below, with broken traces of a fine white line at the division. The subspriculars are edged below by darker green shading off to a paler blue-green ventrally. There is a whitish broken central line ventrally; to each side of the ventral surface there is a short irregular white streak on the anterior half of the second to seventh abdominal rings, better marked before each proleg.

Head pale green, the lobes prominent and bearing tiny black freckling above and again in narrow bands to each side of the epicranial suture, the ocelli set on a white arc. Prothoracic plate usually pale green and shining but black in some specimens, sparsely or densely dotted with black, bounded by the subdorsals; anal plate similarly pale green, dotted and bounded by the subdorsals which also run around the posterior margin. True legs green, tinged with ochreous, prolegs pale green, anal claspers green edged with white of the subspracular stripe. Tubercles small, jet black on a pale base, each with a very short fine hair. Spiracles oval and black centred with white, and very small except the first and last pairs, placed just above the white subspracular in the paler part of the lateral space, and at the centre of the segment.

There is little variation for *septentrionalis* seems to lack the pink and mottled forms of *viriplaca*. A much darker form has the dorsal stripe obscured and the subdorsals a dirty white. The green of *septentrionalis* is rather darker and richer than is usual with *viriplaca* in a way that is impossible to describe but that is readily discernible: in markings and pattern both species are identical, even to the minute markings on the head and plates, except when the black prothoracic plate is present in *septentrionalis*.

Figures—Pl. III, figs. 7-9, all last instar, on flowers of *Erica*, New Forest, Hants, 30.viii.57, H. B. D. Kettlewell.

Calophasia lunula Hufn. Toadflax Brocade.

This neat little moth belongs to that spectacular band of post war discoveries made along the south-east coastline of England, the species evidently having become established in but a few years after the initial impetus of migration; such at least is my opinion, for I cannot believe that such a conspicuous larva could for long escape notice at so popular a collecting ground as Dungeness, Kent.

Last century British records of *C. lunula* have been soundly debunked by P. B. M. Allan (1940, *Entomologist*, **73**: 203) and the Shoreham, Sussex, specimen of Rait-Smith in 1939 is one of the few past genuine occurrences. There was a moth again from Sussex at Bexhill in 1950 with another from Essex in the year following and one also from Dungeness. The first larvae were discovered in 1952 at Dungeness, Southend and Dartford and in succeeding years large numbers were collected from along the south-east coast, from Bradwell in Essex around the Kent coast to Dungeness and as far west as Shoreham and Lancing in Sussex: all these localities were hard by the sea or at most within a short distance of it, but by August 1954 larvae had been found inland at Tonbridge. Since that time the species seems to have lost ground everywhere but at Dungeness.

The moth can be double brooded with us, emerging throughout June well into July, and again in August, when most wild caught ones have been taken. Larvae can be found from early July until the middle of August (late ones) and again throughout September. They normally feed up very quickly. Wild larvae have been found feeding mostly upon the common Yellow Toadflax with some on the scarcer tall purple *Linaria purpurea* L. (Mill.) and on the dwarf pale *L. minor* L. (Desf.): Dr. Birkett (1956, *Ent. Rec.*, **68**: 274) fed larvae in captivity on the leaves and flowers of Ivy-leaved Toadflax (*L. cymbalaria* L. (Mill.)) and Symes (1956, *Ent. Rec.*, **68**: 201) fed them on *L. repens* L. (Mill.).

The first records are discussed in 1954, (*Ent. Gaz.*, **5**: 66), together with an account of the early stages which was supplemented by a further note in 1955, *Ent. Gaz.*, **6**: 152. The description given here is as my original note.

Description of the last instar larva. This gaudy larva is quite unlike any other British noctuid. In shape it is very cylindrical, a little flattened along the dorsum, with a pronounced taper to each end and especially to the small head. It is only sparsely hairy, the hairs being exceedingly short and fine. The thoracic segments are much puckered along the lateral folds. In length measures to 36 mm.

The general scheme of markings and colour is divided into a broken black area along the back with three bright yellow stripes, and pale blue grey along the sides and below, adorned throughout with black dots. Dorsal stripe thick, deep yellow, much narrower along the thoracic rings and again on the later abdominals. Subdorsals of same colour, broad but more restricted between the segments. Subspiracular

bands broader still, yet wavy and broken, being composed of large yellow smears. The space between the dorsal and subdorsal lines is broken into irregular transverse black streaks and blotches which along the middle abdominal rings follow a sequence of two larger, rather rounded, marks surrounding a small dot or wedge on each side of the dorsal line and separated from the next segment by three or four very narrow streaks. On the thoracic rings the black marks continue as a simple series of shorter and thicker strokes which form a thick uninterrupted band when the rings are contracted, and merge smoothly with the black marks above the head.

Below the subdorsals the skin is marked with large rounded black spots set amongst finer dots and freckling; the largest is placed centrally, immediately above the subspiracular band and posterior to the spiracle, and two more adjacent to the subdorsal line are widely set, the rear spot frequently streaked ventrally. Below the subspiraculars two large rounded spots and additional freckling continue the pattern to beneath where the skin is clear but for tiny flecks.

Prothoracic plate so weakly chitinised that it is hidden by the bright colours that cross it; anal plate narrowly bisected by yellow. Spiracles small except those on segment eleven which are twice as large, oval, black, situated immediately above the yellow band. Prolegs blue-grey with a black spot at the extremity; anal claspers marked with four large black patches; thoracic legs plain blue-grey. Head small with a large black blotch above divided by blue-grey, two small dots in the centre of the clypeus with a large dot to each side and another on each side of the head.

There is some variation of the black dorsal pattern which may be so heavily developed as to obliterate all but the fine pale intersegmental fold and a single fine transverse line; associated with this the lateral spotting becomes coarser and heavier. The wild larva is a beautifully coloured contrast of pale blue, black and yellow but larvae reared from the egg may have the colours dulled and lustreless.

Figures—Pl. IV, figs. 1-3, all last instar, on *Linaria vulgaris* Mill., Dungeness, Kent, 25.ix.53.

Minucia lunaris Schiff. Lunar Double Stripe.

For many years the Lunar Double Stripe was of exceedingly rare occurrence in Britain and the genuine records from Kent and Sussex in the last century were as few as the fraudulent dealers' specimens were many. In 1942 two larvae were found at Ham Street in Kent by Dr. G. V. Bull, a find that ushered in the post war collecting boom at those woodlands. Further records came from South Essex in 1951. Selsey (West Sussex) in 1952 and South Hampshire in 1954 but what may be called the home of the species continued to be the oak woods of the Ashford area of Kent extending into East Sussex. In 1956 (*Ent. Rec.*, 68: 248) J. M. Chalmers-Hunt called attention to the apparent

decline in the Kent populations since 1952, and present trends suggest that the moth may again become uncommon.

The post-war abundance could be attributed to the large scale cutting of woodlands during the war and soon after which provided an unusually large amount of tender coppice shoots on which alone the larva feeds; in normal times it doubtless subsists on epicormic shoots at the oak bole. It feeds at night only on the juicy summer shoots and could at one time be beaten freely from stool growth that showed signs of foliage stripped from the tips or even the tender shoots part bitten through. Foliage from the crown of the tree is quite unsuitable. The powdery white oak mildew disease appeared to have no ill-effect upon the larvae, indeed they seemed to be as common or more common amongst infected foliage.

The moth is single brooded, emerging from mid May until the end of June: during its period of plenty it came to sugar and to light and could be flushed by day from rest amongst dried leaf litter; at dusk it could be seen flying amongst the oak stools. The larva feeds up during July and August and the winter is passed in the pupal stage.

The egg and pupa are described in 1953 (*Ent. Gaz.*, 4: 266).

Description of the last instar larva. This large noctuid larva measures to 70 mm. at full growth. In shape it is slender and cylindrical, only a little broader at the centre. It moves and rests in the postures characteristic of *Catocala*.

Colour variable, usually some shade of brown, being mostly vandyke or inclined to sienna, even reddish, but there are also greyish-umbrous examples and even sooty velvet. One of the most handsome forms is black with bright red subspiracular bands.

There are three paler bands along the back, a central broader band and a narrower subdorsal to each side of it, followed by another laterally and then the bold subspiracular stripe below. All bands and their interstices bear fine black wriggling striations that run the full length of the body although obscure at the abdominal intersegmental divisions. The subspiraculars may be bright vermilion or deep black or a beautiful mottled combination; less often they may be reduced and dull brown. Beneath, the skin is much paler and on segments 6-9 there is a large purple brown patch between the claspers and a smaller spot on the tenth.

The subdorsal band carries a conspicuous yellow squared patch on the fourth segment which may be orange centred. It is usually edged below by a smaller black spot and in well marked examples there are still smaller black markings to each side. These bright spots give the appearance of eyes, and can be thrown into prominence by humping of their segment. Also on the subdorsal band are smaller yellowish patches on segments 7-9; and between the subdorsals of segment 11 there are twin short conical prominences edged behind in dark red or they may be wholly orange.



Figs. 1-3, *Calophasia lunula* Hufn. ($\times 1\frac{1}{4}$ approx.)

Figs. 4-7, *Minucia lunaris* Schiff. ($\times 1\frac{1}{4}$ approx.)

In the duller, more sombre specimens the subdorsal ornamentation is suppressed and instead the pale dorsal warts of the abdominal segments show up as bright points.

Prothoracic and anal plates weak and ill-marked. True legs pale brown, claspers with a plate of white or yellow and freckled with black above. Head large, red-brown with two short fine stripes in front and striped like a clove by a broad lanceolate yellow stripe to each side. Spiracles broadly oval, black and pale centred, placed above the subspiracular band.

Figures—Pl. IV, figs. 4-7, last instar, reared on oak shoots, ab. *ovis*, Ham Street, Kent, 4.viii.52.

HOW SOME INSECTS, ESPECIALLY THE EGG STAGES, AVOID DROWNING WHEN IT RAINS

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Read 12th May 1960.

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INTRODUCTION

A great many terrestrial insects are exposed to the danger of drowning whenever it rains at all heavily, a frequently recurring hazard in most climates. This danger would seem to be particularly acute for their immobile stages, the eggs and pupae, which are normally glued or otherwise fastened to the substrate and so are necessarily submerged beneath a layer of water whenever it rains heavily. At first sight it would appear that the stages of insects that are regularly exposed to flooding must be adapted in some fashion to survive such a contingency, but surprisingly little is known about how they are so adapted. This paper is chiefly concerned with the recently discovered physical gill known as a plastron that is used by the terrestrial eggs of many insects when they are covered with water. Before discussing the ways in which the eggs are adapted to avoid drowning when it rains, the very meagre information we have on how other stages of insects survive the same hazard is reviewed.

Little is known of the ways in which larvae and adults avoid drowning when it rains heavily. They are often trapped in temporary pools and sink to the bottom. Many species cease to struggle after a relatively short time and become comatose, that is, they cease to respond to stimuli and do not recover their capacity for response until they have been dried for some minutes or even hours. When immersed they absorb water. Many absorb enough water to stretch the intersegmental membranes. Recovery after immersion for hours or even days is possible because they have obtained enough oxygen from the ambient water, perhaps sometimes largely through their intersegmental membranes, to satisfy their requirements so long as they are comatose.

Judging from preliminary experiments, there would appear to be

some relation between survival and the rapidity with which the animals become comatose. For instance, when dytiscid beetles are prevented from coming to the surface to replenish their supplies of air, they struggle for a long time before they become comatose. In contrast, carabids of similar size become comatose far more quickly and survive immersion much longer. The staphylinid, *Ocypus olens* Müll., becomes comatose on being dropped into water far more quickly than any other insect so far tested. Some specimens become comatose within 30 seconds. It scarcely seems likely that such rapid response is due to shortage of oxygen: it would seem to be a response to contact with water rather than to lack of oxygen, but the phenomenon is being investigated.

Many adult insects remain at, or float to, the surface of pools and either crawl out at the edges or onto objects projecting through the surface. Since most natural objects are in some degree wettable, the immediate surface of the water around them is inclined steeply upwards. It is of some interest to note how small insects negotiate such inclines up which they cannot walk or swim. The insect normally overcomes the upward slope of the water surface by the simple device of distorting the surface so that a meniscus similar to that of the edge of the pool is formed against some part of the body of the insect. Having done this, and being sufficiently close to the edge so that no stretch of relatively flat surface intervenes between the meniscus it has formed and that at the water's edge, the insect will be pulled rapidly up the incline without any further activity on its part as the free energy of the system diminishes and the menisci move together (Hinton, 1954, p. 138). The degree to which there is a special behaviour pattern associated with the distortion of the water surface varies greatly, but, as pointed out by Hinton (*loc. cit.*), in all floating terrestrial insects that were observed, the surface film was found to be bent upwards at some points and downwards at others. Thus floating terrestrial insects are provided with a means of overcoming the upwardly inclined surface at the edges of pools.

Many pupae that are found in places likely to be flooded are enclosed in cocoons. Preliminary experiments show that such cocoons are rigid enough not to collapse under the hydrostatic pressures to which they are likely to be exposed. Thus the volume of gas contained in the cocoon is not altered by the pressure differences actually experienced. The interstices in the meshwork of the cocoon provide a large water-air interface. In those cocoons in which the outer layers of silk are hydrophil, the water-air interface is established below the outermost surface of the cocoon, and per unit area of interface the plastron must be less effective since it is surrounded by a relatively stationary layer of water that permits a thick diffusion boundary layer to be formed. It may be noted here that any cocoon, and more especially those in which the outer layers of fabric absorb water, must also damp down the humidity fluctuations of the environment (Hinton, 1953). In most instances, the chief selective value of cocoons probably

lies in the immunity they confer against casual predators and parasites (Hinton, 1955), but this is not to deny that they also have an important role to play in respiration when it is raining and in damping the humidity fluctuations of the ambient air when it is not raining.

The functions subserved by terrestrial egg cocoons and the silk mats used to cover the egg mass, especially in many groups of spiders, are of course similar to those subserved by pupal cocoons. The aquatic egg cocoons of many Hydrophylidae have a hollow "mast" or stalk that opens at the surface of the water. These cocoons are thus provided with a direct route for the entry of atmospheric oxygen into the body of the cocoon that contains the eggs (e.g. see Vlasblom and Wolvekamp, 1957). The egg cocoons are usually found in ponds and ditches, environments in which the oxygen pressure is apt to fluctuate widely and is often very low at night. Tests show that the layer of air entangled by the meshwork of the cocoon resists considerable pressure differences. It is therefore possible that these cocoons may sometimes function as plastrons when the stalk becomes entangled so that a rise in the water level prevents it reaching the surface.

The possession of a plastron enables an egg to extract oxygen from the ambient water and therefore to continue its development during the period when it is flooded. Most insect eggs, however, do not possess a plastron. They may be laid in sheltered situations where they are protected from flooding, or on leaves, twigs, and similar places where the drainage is particularly good and so are only covered by a thin film of water when it is actually raining or for very short periods after it has stopped raining.

Some insect eggs that have a relatively impermeable chorion and lack a plastron, such as those of some Staphylinidae, are, however, found in places that may become flooded when it rains. The respiratory system of such eggs usually consists of an inner layer of air in the chorion that can be replenished through minute aeropyles extending from the inner chorion to the surface. The total area of the water-air interface at the external openings of the aeropyles is so small as to be ineffective in extracting sufficient oxygen from the water to meet demands. Thus, even when these eggs are flooded with well-aerated water, they are unable to secure enough oxygen for normal development. Such eggs often resist prolonged flooding, and their particular adaptation to this contingency thus appears to be their capacity to survive a very great reduction in their metabolic rate: they tolerate a switch over from a metabolic rate necessary for rapid growth and development to one adequate only for maintenance or a little more.

Figures for oxygen uptake under these extreme conditions are not available, but Lincoln (1961) has found that the O_2 uptake of the egg of the staphylinid, *Ocypus olens* Müll., is reduced from 1.6–1.8 $\mu\text{l}/\text{hour}$ to 0.4 $\mu\text{l}/\text{hour}$ when it was covered by a 2 mm. film of well-aerated water. Experiments show that it will recover and develop normally after its respiration has been continuously reduced to 0.4 $\mu\text{l}/\text{hour}$ for four days. The egg of *Ocypus* does not illustrate my point very well because

the reduction in O_2 uptake is not particularly great. The reason for this is probably that around the equatorial band of the egg there are about 4,000 aeropyles with a combined water-air interface area far greater than normal. The egg of *Ocypus* could, perhaps, be considered to have a rudimentary plastron.

THE PLASTRON AND THE ENVIRONMENT

The term plastron has been restricted to describe a gas layer of constant volume and an extensive water-air interface; held in position by a system of hydrofuge structures that resist the entry of water under pressure. In well-aerated water a plastron enables an insect to remain immersed indefinitely, when it obtains the oxygen it requires from the ambient water.

Until very recently the plastron method of respiration was thought to be confined to aquatic insects. Nearly all aquatic insects with a plastron are found in waters in which the oxygen pressure is maintained at a fairly high level, such as rapidly flowing streams, the littoral of large lakes, and intertidal areas. This ecological distribution is no accident but is due to the fact that a plastron also serves as an efficient means of extracting oxygen from the tissues should the oxygen pressure of the environment fall below that of the tissues.

The well-aerated waters in which most plastron-bearing aquatic insects occur are characterised by the fact that they are subject to frequent and often large fluctuations in the level of the water. That is, they are environments that can fairly be said to be alternately dry and flooded; and the great selective advantage of the plastron can only be understood in relation to this particular feature of the environment. In water the plastron provides the insect with a relatively enormous area for diffusion without necessarily involving it in any reduction in the impermeability of its cuticle. Since the tracheal system of plastron-bearing insects is an open one, a direct route for the entry of atmospheric oxygen is provided by the spiracles. Thus the capacity of the insect to avoid the loss of water when the environment is dry is in no way necessarily impaired by the provision of a plastron. Similar considerations apply to the chorionic plastron of many insect eggs, especially those that have horns.

Once it becomes possible to specify the features of aquatic environments that confer a great selective advantage upon the plastron method of respiration, it also becomes possible to distinguish the same features in other environments that at first sight may appear to be very different indeed. As we have seen, the essential features of the aquatic environment with respect to the plastron method of respiration are: (1) that it is alternately flooded and dry, and (2) that when flooded the oxygen pressure of the water is maintained at a high level. Now, these two essential features of the aquatic environments in which plastrons are evolved are reproduced in the environment of terrestrial insects: the difference is merely that for the terrestrial insects the flooded periods are less frequent and shorter.

If the analysis given in the preceding paragraph is correct, we should expect to find the plastron method of respiration widespread amongst terrestrial insects. That this is indeed so has already been indicated in the introduction. A plastron was first reported in terrestrial insect eggs in 1959 (Hinton, 1959), and from more recent work (Hinton, 1960a, b, c), and the new instances cited in this paper, it is clear that amongst eggs, to say nothing of other terrestrial stages, more instances of the independent evolution of a plastron are already known than amongst all aquatic insects. That this should be so is not perhaps surprising when we consider the relative numbers of aquatic and terrestrial species.

If the plastrons of terrestrial insect eggs are to be efficient respiratory structures they must of course resist wetting by the pressures exerted by raindrops falling on them. That they do so has been determined by direct observations on the eggs of two species, *Hebecnema umbratica* Meig. and *Scopeuma stercorarium* L. (Hinton, 1960a). These two species have plastrons that are amongst the least resistant to wetting by excess pressures. Assuming a rain drop to be spherical (it is in fact pyriform), the pressure it exerts on striking a plastron is equivalent to a head of water about 1,000 times its diameter. A large rain drop of a diameter of 4 mm. will thus exert an excess pressure equivalent to about 31 cm. Hg. But this pressure is exerted for only about a millisecond, and experiments show that 93 per cent of the eggs of *Scopeuma* and 30 per cent of the eggs of *Hebecnema* retain over 90 per cent of the plastron gas when such a pressure is applied for 30 minutes (Hinton, 1960a). It therefore follows that the species with the least resistant plastrons are more than adequately protected against being struck by rain drops. In the first microsecond the pressures exerted by the rain drop may be very much higher, but as the time interval is so short they can probably be disregarded.

The resistance of the plastron to wetting by excess pressures varies directly as a surface tension of the water. For instance, the surface tension of a two per cent solution of isobutyl alcohol is only about 46 dynes/cm. In such a solution a much lower pressure is required to wet the plastron than in clean water (Hinton, 1960a, fig. 14). The surface tension of the pools of rain water that accumulate on the organic materials in which many terrestrial insect eggs are laid is appreciably lowered by surface active substances that pass from such materials into the water. These facts help to explain why the plastrons of terrestrial insect eggs resist pressures far in excess of any to which they are likely to be subjected even in the most severe flooding. They also provide an explanation of the paradox that such plastrons are often more resistant to excess pressures than are the plastrons of many wholly aquatic insects: under natural conditions the terrestrial forms are often exposed to concentrations of surface active substances rarely if ever encountered in unpolluted streams.

It has been shown (Hinton, 1960a) that egg plastrons may be placed in two groups according to their resistance to excess pressures: (1)

those normally found in cow dung, and (2) those normally found in decaying vegetable and animal materials. In the first group the resistance of the plastron usually falls off rapidly on exposure to excess pressures of over 30 cm. Hg for 30 minutes, whereas the second group resists excess pressures of 60 to 100 cm. Hg for 30 minutes or more. It would appear that this difference in resistance is related to the degree to which surface active substances reduce the surface tension of water in contact with the two sorts of materials. The surface tension of pools of rain on cow dung is reduced to about 50 dynes/cm., whereas the surface tension of water standing on decaying meat is reduced to about 40 dynes/cm. It is of some interest to note that the Sepsidae, which are the only flies of the first group that will sometimes also oviposit on dead animals, have egg plastrons that are more resistant to excess pressures than those of the species restricted to cow dung.

THE THREE KINDS OF CHORIONIC PLASTRONS

For the sake of convenience egg plastrons may be placed in the following three groups: (I) plastron confined to the median area between the hatching lines, as in many Calliphoridae and Muscidae; (II) plastron extending over most or all of the surface of the shell, as in some Sphaeroceridae and most Muscinae; and (III) plastron either confined to the horns, as in the Nephidae and Encyrtidae, or present both on the horns and other parts of the shell, as in many Muscidae. The arbitrary nature of this classification of chorionic plastrons needs no stressing, and is only too clear when the third group is considered. For instance, it is often very difficult to decide, especially amongst the Muscidae, whether or not the dilated sides of the median area between the hatching lines are sufficiently produced anteriorly to be called horns. Thus, whether some eggs are placed in the first or in the third group may rest on a decision that is largely subjective or at best purely arbitrary. Furthermore, each of the three kinds of chorionic plastrons has been independently evolved on numerous occasions.

Group I

The respiratory system of the shell of *Calliphora erythrocephala* Meig. is typical for the group. A continuous film of air is held between the vertical columns in the inner part of the chorion (fig. 1). The vertical columns are arranged, as in most other egg shells that contain an inner film of air, in somewhat irregular hexagons, the boundaries of which correspond to the boundaries of the follicular cells (fig. 5). The film of air is continuous with that held in the median area between the hatching lines, since the opposed surfaces of the median area and the shell laterad from the median area consist of an open network in the plane of the hatching lines (figs. 1, 2). The shell between the hatching lines (fig. 3) consist of three distinct layers (fig. 2). The outer and inner layers consist of struts or columns that arise perpendicularly from the middle layer. A continuous film of air is held between the columns of

both layers, and holes through the middle layer effect the continuity of the air films in the outer and inner layers (fig. 2). The columns of the outer layer are branched in a plane normal to their long axes (fig. 4). These horizontal branches form an open hydrofuge network that provides a large water-air interface when the egg is immersed. Anderson (1960) has shown that if the interstices between the plastron network of the egg of *Calliphora* are blocked almost 100 per cent of the eggs die, and the incubation period of the very few that survive is greatly increased. He has also shown that partial blocking of the plastron greatly increases the incubation period.

Group II

Most genera of the subfamily Muscinae belong to this group, e.g. *Musca* (s. str.), *Orthellia*, *Dasyphora*, *Pyrellia*, *Mesembrina*, *Morellia*, *Polietes*, *Stomoxys*, *Haematobia*, and *Lyperosia*. The structure of the chorion of the median area between the hatching lines and that of the chorion outside the hatching lines (fig. 6) is similar. The chorion nearly everywhere consists of three layers basically similar to those of the median area of the species in group I. In all oviparous Muscinae so far examined the vertical struts of the inner layer do not connect to a continuous sheet of chorionin, as in the Calliphoridae, many Phaoniini (Muscidae), and other groups. Instead, the inner apices of the vertical columns or struts of the inner meshwork layer are branched in a plane normal to their long axes to form an open inner network (fig. 6). In a previous paper (Hinton, 1960c) I implied that this type of shell structure was confined within the Muscidae to the subfamily Muscinae, but I have since found that the shell of some genera of Anthomyiinae, e.g. *Leptohylemyia*, is similar.

Some other eggs also have a plastron that extends over most or all of the shell, e.g. *Copromyza equina* Meig. (Sphaeroceridae). The shell of the latter is not so complex, but the innermost surface of the chorion also consists of an open network. In most Muscinae, and in *Copromyza* and other eggs of similar structure, there are thus canals or aeropyles that open over most or all of the surface of the shell and permit the direct entry of atmospheric oxygen to the subchoral membranes. The width of these aeropyles apparently always exceeds the mean free path of the oxygen molecule. They do not much impede the diffusion of oxygen inwards, and by the same token do not impede the outward diffusion of the smaller water vapour molecule. Thus a shell like that of the Muscinae can play little part in preventing water loss except in so far as tidal movements are prevented in the film of air it holds and so the formation of a thick humidity gradient is made possible. The subchoral membranes of the Muscinae are not particularly water-proofed, as might have been expected from the open nature of the shell. For instance, Larsen (1943) has shown that when the relative humidity falls to 83 per cent less than 15 per cent of the eggs of the housefly hatch, and when it falls to 93 or 94 per cent only 5 per cent of the eggs of *Lyperosia* hatch.

The shell of the Syrphidae consists of a meshwork that holds a film of air between a continuous inner sheet of chorionin and an interrupted outer sheet of chorionin. The outer sheet of chorionin is broken up into many small "islands" (figs. 7-11, see especially fig. 9). When the egg is submerged in water, the air trapped in the meshwork is often held against a considerable pressure difference. For instance, the meshwork of *Rhingia campestris* Meig. was not wetted when subjected to an excess pressure of 60 cm. Hg for one hour.

Group III

As already stated, the species included in this group are characterised by possessing plastron-bearing horns. The horn consists of a meshwork of some kind (e.g., fig. 13) that forms a fine but open network (fig. 14) over part or all of the horn. The only exception to this rule so far known is the horn of *Saltella scutellaris* Fall. (Sepsidae). In this species the surface of the horn consists of a sheet of chorionin that is broken into hexagonal islands (Hinton, 1960a, fig. 2). When the egg is immersed in water, the water-air interface is confined to the channels between the islands. Species with plastron-bearing horns may also possess a plastron elsewhere. For instance, the Muscidae with respiratory horns also have a median longitudinal plastron between the hatching lines. In such species the surface area of the plastron between the hatching lines may be as great as in species which have no other plastron but that between the hatching lines, e.g., many Muscidae and Calliphoridae.

The air film contained in the meshwork of the respiratory horn is continuous at the base of the horn with the film of air held in the shell. In most dipterous eggs with horns, the air in the shell is held between a system of vertical columns, as in the shell of *Drosophila* (fig. 15). However, in some groups, such as the Nepidae, the air-containing part of the shell may be much more complex, and there may be two distinct but communicating films of air.

INDEPENDENT EVOLUTION OF PLASTRON-BEARING HORNS

In order to establish the independent evolution of similar organs or structures in two or more groups it is only necessary to show that such organs or structures have no phyletic continuity, that is, that the nearest common ancestor of the groups concerned lacks the organs or structures in question. A demonstration that two organs or structures are of independent origin is, of course, also a demonstration that they are not homologous, however close and detailed may be their resemblance. Conversely, lack of resemblance between organs or structures of different groups is *of itself* no argument against homology, since phyletic continuity may exist between organs or structures that have had a long history in quite different environments and may even have come to subserve quite dissimilar functions.

Although the respiratory structures of few insect eggs have been adequately described, enough is now known about the general form of

the eggs in the Class to show clearly that eggs with respiratory horns are very infrequent. Their extremely sporadic occurrence not only within the Class but also within particular families seems to be sufficient testimony to their independent origin in the absence of evidence of any kind to suggest that the ancestral egg of the Insecta was provided with horns. Horns bearing a plastron at present appear to be a primitive feature in only two families of insects, namely, the Nepidae (Hemiptera) and the Sepsidae (Diptera). So far as is known, the eggs of all species of these two families have plastron-bearing horns. It seems very unlikely that any Nepidae will be found without horns; half of the known genera have been examined. It is possible that some Sepsidae will be found not to have horns, since up to now only four of the genera in this family have been examined. All other families that have eggs with plastron-bearing horns also include species that have no such structures in the egg stage.

In the following pages, 15 instances of the independent evolution of plastron-bearing horns are listed. The number of times that such horns have been evolved is, of course, much greater. For instance, the Drosophilidae are cited as a single instance of the independent evolution of plastron-bearing horns, but within the genus *Drosophila* such horns have probably been evolved on several occasions unless we are to suppose that the common ancestor of the recent species had a large number of respiratory horns and that differences in their number are due to reduction rather than to, as appears most probable from the available evidence, the acquisition of additional pairs of horns. No attempt has been made to list instances of the independent evolution of the plastron on other parts of the shell, such as between the hatching lines, but it seems clear that instances of the independent evolution of the plastron that do not involve horns far outnumber those that do.

(1) The family Nepidae (Hemiptera) includes 12 genera. The eggs of species in six of these genera have been examined: *Nepa*, *Telmato-trephes*, *Borborophilus*, *Laccotrephes*, *Ranatra*, and *Cercotmetus*. All have anterior respiratory horns. The Ranatrinae (*Ranatra*, *Cercotmetus*) have only two horns. Most Nepinae have five to ten horns, but some have as few as four (*Laccotrephes fabricii* Stål) and others (*Borborophilus primitiva* Mont.) as many as 25 or 26. Amongst the Nepinae the number of horns usually varies intraspecifically, and the same female may lay eggs with different numbers of horns. For instance, of the 695 eggs examined of *Nepa cinerea* L., 40 had six, 326 had seven, 247 had eight, 77 had nine, and 5 had ten horns. It has been found that the same individual of *Nepa cinerea* will produce eggs with different numbers of horns (Hinton, 1961a). An account of the structure of the horns of 16 species has been given by Hinton (1961a).

(2) In the Encyrtidae (Hymenoptera) two types of eggs may be recognized, the stalked and the encyrtiform (Clausen, 1940). The ovarian egg of both types is two-bodied. The contents of the anterior body or bulb are forced into the posterior body or bulb during the process of oviposition. The tube that connects the two bulbs is left

as a slender stalk projecting from the anterior end of the posterior body. In the stalked type of egg, the stalk is said to be functionless after the egg is deposited, or it may, in some species, serve to attach the egg to the integument or to one or other of the internal organs of the host. In the encyrtiform egg a small to large part of the chorion contains a continuous film of air in a space supported by fine vertical columns. The air is thus held in the egg shell precisely as in many Diptera and other insects. This air-containing chorionic structure extends up one side of the tube: it is in fact a thickened strip of the wall of the tube of the ovarian egg. The air-containing part of the chorion was called the aeroscopic plate by Silvestri (1919), and it has since been known by that name. Previous views as to the structure and function of the aeroscopic plate have been summarised by Maple (1937) and Clausen (1940). I have been able to study the eggs of *Microterys flavus* How. and *Leptomastix dactylopi* How., which are similar in all essential features of the respiratory system.

In his study of *Oöencyrtus johnsoni* How., Maple (1937, p. 151) concludes that, ' . . . there is little reason to suppose that the structure of the plate at the apex of the stalk is any different from that of the rest of the "granulated" area . . . ' In *Microterys flavus*, however, that part of the aeroscopic plate that is external to the host is open between the vertical columns, whereas the surface of the part of the aeroscopic plate that is inside the host consists of an unbroken, continuous sheet of chorionin. As might be expected from such a structure, paraffin oil applied to any part of the aeroscopic plate external to the host immediately displaces the air, whereas it does not displace the air in the aeroscopic plate when applied to the surface of any part of it inside the host.

When it rains or when the host is otherwise submerged in water, the air is not displaced in the external part of the aeroscopic plate, which provides the parasite with a fairly large water-air interface through which oxygen diffuses into the aeroscopic plate and then down the air-containing part of the stalk. The air held in the aeroscopic plate external to the host functions as a plastron. In tests with a few parasitised scale insects it was found that sometimes more than 50 per cent of the plastron gas was retained when the eggs were subjected to an excess pressure of 14 cm. Hg for two hours. All of the material used had been preserved in alcohol. It seems very likely that the hydrofuge properties of the plastron network were reduced by the alcohol and that the plastrons of fresh eggs would resist greater pressures.

Thorpe (1950, p. 383) says, "It is not impossible that the aeroscopic plates of the stalked eggs of certain chalcids (Encyrtidae) parasitic on scale insects may prove to be in part a plastron mechanism for extracting oxygen from the host's blood and making it available in gaseous state for the parasite". The fact that the outer surface of that part of the aeroscopic plate that is inside the host always appears to be a continuous and often rather thick sheet of chorionin tells against such

a hypothesis. Furthermore, when an aeroscopic plate is present in encyrtid eggs, it always appears to extend to that part of the tube or stalk that remains external to the host, and the outer surface of the chorionin does not form a continuous sheet over the part of the aeroscopic plate exposed to the air. That is, there is a direct route for the entry of atmospheric oxygen into the respiratory system of the shell when the host is not covered by water. When it rains or the host is otherwise submerged in water, the externally open aeroscopic plate on the tube outside the host provides a large water-air interface for the extraction of oxygen dissolved in the ambient water.

In the Encyrtidae that have an encyrtiform egg, the first three larval instars are metapneustic. The posterior spiracles are closely applied to the inner surface of the aeroscopic plate of the shell. The precise manner in which the spiracles are attached to the aeroscopic plate is unknown, but it is the general opinion (e.g. Thorpe, 1936; Maple, 1937) that during the first three instars the larva is using the aeroscopic plate to obtain oxygen. It would appear probable that the inner surface of the aeroscopic plate of the body of the shell is an open network, as is the inner surface of the chorion of many egg shells that contain air, e.g. all Muscinae (Hinton, 1960c) and some other Muscidae as well as some Sphaeroceridae (*Copromyza*). For one stage of an insect to employ the plastron of a previous stage is a phenomenon that is already known: the plastron of the spiracular gill of the pupal stage is always the chief respiratory organ of the pharate adult (Hinton, 1957, 1961b).

The functional significance of the two-bodied eggs of the Encyrtidae (fig. 17) would appear to lie in the fact that in order to insert any given volume of egg into the host a smaller puncture need be made in the skin if the egg is two-bodied: the first body is inserted into the host and the second body is then squeezed in the ovipositor until its contents move down the stalk and are emptied into the first body. Presumably it is to the advantage of the parasite to damage its host as little as possible in the process of oviposition.

(3) The egg of *Dryomyza flaveola* F. (Dryomyzidae) has a pair of long anterior horns (fig. 21). The structure of the horns and the plastron they support has been described in some detail by Hinton (1960a). It is not known if any other Dryomyzidae have horns, but such structures are absent in *Neuroctena anilis* Fall.

(4) All of the Sepsidae examined (*Sepsis*, *Sepsidimorpha*, *Nemopoda*, and *Saltella*) have a single anterior respiratory horn. It therefore seems probable that the eggs of all species of the family may also be provided with a horn. So far as is known, the horn is always several times as long as the egg (fig. 18). The structure of the horn and plastron of *Sepsis violacea* Meig. and *Saltella scutellaris* Fall. has been described (Hinton, 1960a).

(5) One of the Coelopidae, *Orygma luctuosa* Meig., has a pair of long anterior respiratory horns. Other Coelopidae such as *Oedoparea buccata* Fall., *Coelopa pilipes* Haliday, and *C. frigida* F. lack respiratory

horns. The only eggs of *Orygma* examined were dissected out of a dry museum specimen, and the resistance of the plastron to wetting has not been tested.

(6) The species of *Coprophila* (Sphaeroceridae) have a pair of long anterior horns, e.g. *C. acutangula* Zett. and *C. lugubris* Haliday. Horns occur in some other genera of the family, whereas still others, e.g. *Copromyza*, lack horns. The eggs of only a few species of Sphaeroceridae are known, but even from this small number it would appear that the family may well rival the Muscidae in the number of times plastron-bearing horns have been independently evolved.

(7) *Leptocera moesta* Vill. (= *Limosina moesta*) (Sphaeroceridae) has about ten anterior respiratory horns (Hammer, 1941). Their disposition is such as to strongly suggest that they are independently evolved from either those of *Coprophila* or those of the species cited below.

(8) *Leptocera* (= *Limosina*) sp. ? (Sphaeroceridae). This entry is based upon the illustration given by Hammer (1941). On the antero-lateral and anterior margins of the egg there are over 54 small, papilla-like horns.

(9) Most of the known species of *Drosophila* (Drosophilidae) have at least one pair of horns. A few species have more than one pair of anterior horns, e.g. *D. lebanonensis* Wheeler has three to five pairs and sometimes seven to nine horns (Wheeler, 1949). The structure of the horns and plastron of several species has been described by Hinton (1960a), who has also given tables showing the resistance of the plastron of *D. gibberosa* Patt. & Main., *D. melanogaster* Meig., and *D. funebris* F. to wetting by excess pressures. The structure of the respiratory system of *D. gibberosa* is shown in figs. 12-15. Plastron-bearing horns do not appear to be a primitive feature of the family. According to Basden (*in litt.*) they appear to be generally absent in the Steganinae (*Amiota*, *Stegana*, *Leucophenga*, *Protostegana*, and *Phortica*). Such structures are also lacking in *Clastopteromyia inversa* Walk., *Rhino-leucophaga obesa* Loew, *Sinophthalmus pictus* Coq., and *Gitona americana* Patt. According to Basden, horns are also absent in a few species of *Drosophila* (*s. lat.*), e.g. *D. (Phloridosa) flavicola* Sturt. and *D. (Hirtodrosophila) sexvittata* Okada. In the subgenus *Hirtodrosophila* there are both species with and without respiratory horns. The absence of respiratory horns in a few species of *Drosophila* (*s. lat.*) does not necessarily mean that they have been independently evolved on more than one occasion within the genus: they may have been secondarily lost in a few species.

(10) In the Cordiluridae the eggs of *Scopeuma stercorarium* L. (fig. 20), *S. lutarium* F., and probably other species of *Scopeuma* have a pair of anterior horns. The structure of the horns and the plastron of *S. stercorarium* has been described (Hinton, 1960a).

(11) In the genus *Musca* (Muscinae, Muscidae) some of the species of the subgenus *Eumusca* have a single anterior respiratory horn (fig. 19), whereas no such structure is present in other genera of the Muscinae examined (Hinton, 1960c). The horn and plastron of *Musca* (*Eumusca*)

autumnalis Deg. has been described (Hinton, 1960a). The African *M. (E.) xanthginelas* Wd. has a similar horn. According to Dr. H. E. Paterson (*in litt.*), the ovo-viviparous species of *Eumusca* lack horns.

(12) *Myospila meditabunda* F. (Phaoniinae, Muscidae) has a pair of anterior horns. Many genera of the Phaoniinae have a narrow or wide flange on the inner side of each hatching line. In a few genera all or some of the species have the anterior ends of the flanges produced to form distinct respiratory horns, as in *Myospila*. The plastron supported by the horns will resist an excess pressure of 7 cm. Hg for 28 hours, but it is completely wetted by 20 cm. Hg for 30 minutes. It is thus the least resistant plastron of all the eggs tested that are laid in cow dung.

(13) *Mydaea urbana* Meig. (Phaoniinae, Muscidae) has a pair of anterior horns formed as in *Myospila*. In addition it has a long median respiratory horn. On all three horns there are numerous very small papilla-like branches. The plastron remained intact in 11 eggs kept at an excess pressure of 7 cm. Hg for 28 hours.

(14) *Hebecnema umbratica* Meig. (Phaoniinae, Muscidae) has three anterior respiratory horns (fig. 22) constructed somewhat like those of *Mydaea urbana*. The structure of the horns and plastron has been described by Hinton (1960a), who has also given a table of the resistance of the plastron to excess pressures. An allied species, *H. affinis* Malloch, lacks the median respiratory horn, and the anterior ends of the flanges, although a little more produced than the posterior ends, are yet not sufficiently produced to be called horns.

(15) *Limnophora (Calliophrys) riparia* Fall. (Phaoniinae, Muscidae) has a pair of anterior horns formed by the prolongation of the anterior ends of the flanges. The egg has been illustrated by Keilin (1917). Eggs of an unidentified species of *Limnophora* (*s. lat.*)* have been found by me inserted in the egg mass of another fly (*Dica?*) beneath stones in a small stream at East Allington, Devon. The egg of *L. riparia* is laid on moss in streams, and much or all of its incubation period may be passed beneath the surface of the water. Not enough is known about the eggs or the oviposition habits of other species of *Limnophora* to decide if respiratory horns were evolved before, during, or after the invasion of semi-aquatic or aquatic habitats by some of the species. However, the plastron of the median strip between the hatching lines, apparently present in most oviparous Muscidae, clearly pre-dates the invasion of water by some groups in the family. The evolution of the plastron as an adaptation to meet the demands of an environment that may be dry when it is not raining and flooded when it is, also results in the egg stage being pre-adapted to a wholly aquatic environment providing only that the oxygen pressure of such an environment is constantly maintained at a high level. This requirement is met by the streams in which *Limnophora* is found.

*Since this was written it has been found that this egg is a species of Corduluridae.

SUMMARY

The little that is known of the ways in which the different stages of terrestrial insects escape drowning when it rains heavily is reviewed. Attention is drawn to the fact that cocoons subserve other functions besides defence: they function as plastrons when it rains and they serve to damp down the humidity fluctuations of the ambient air when it is not raining. Similarities between features of aquatic and terrestrial environments that confer a selective advantage upon the plastron method of respiration are discussed. The three principal kinds of chorionic plastrons are described. It is shown that the "encyrtiform" eggs of the Encyrtidae (Hymenoptera) have a plastron. Evidence is provided for the view that egg shells with plastron-bearing horns have been independently evolved at least 15 times amongst insects.

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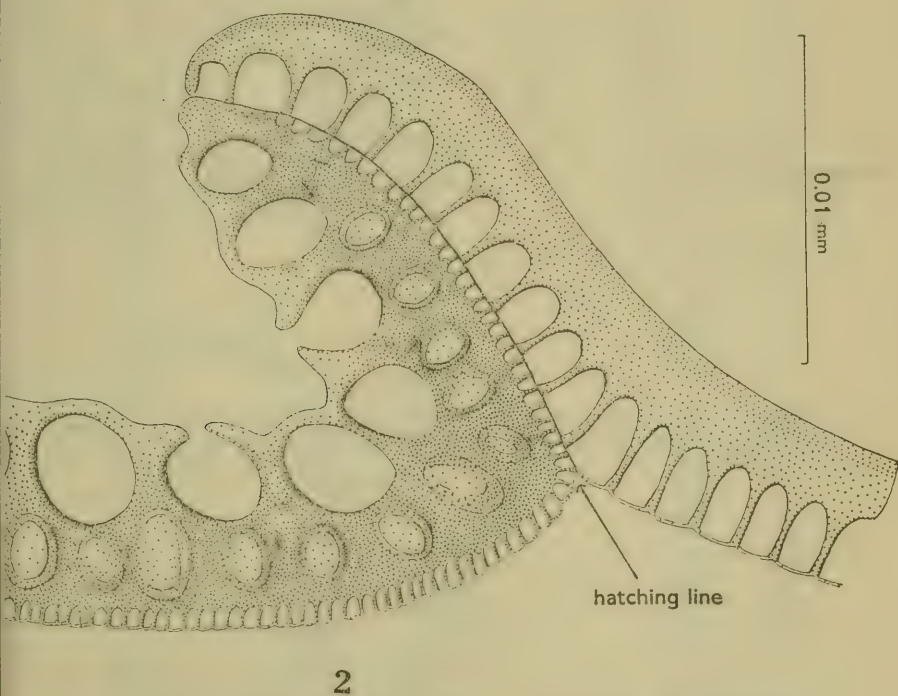
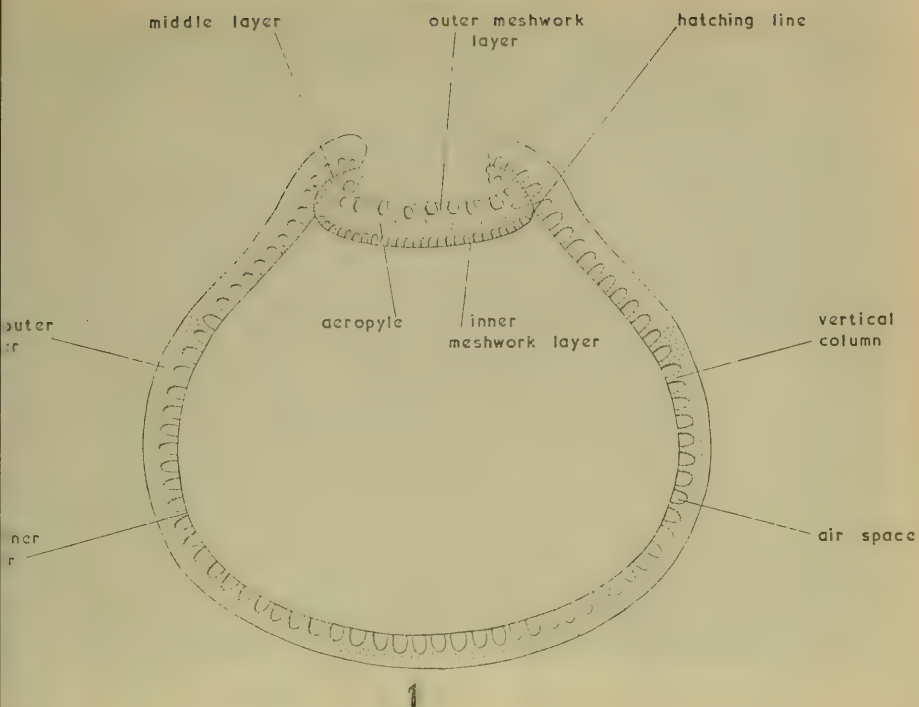
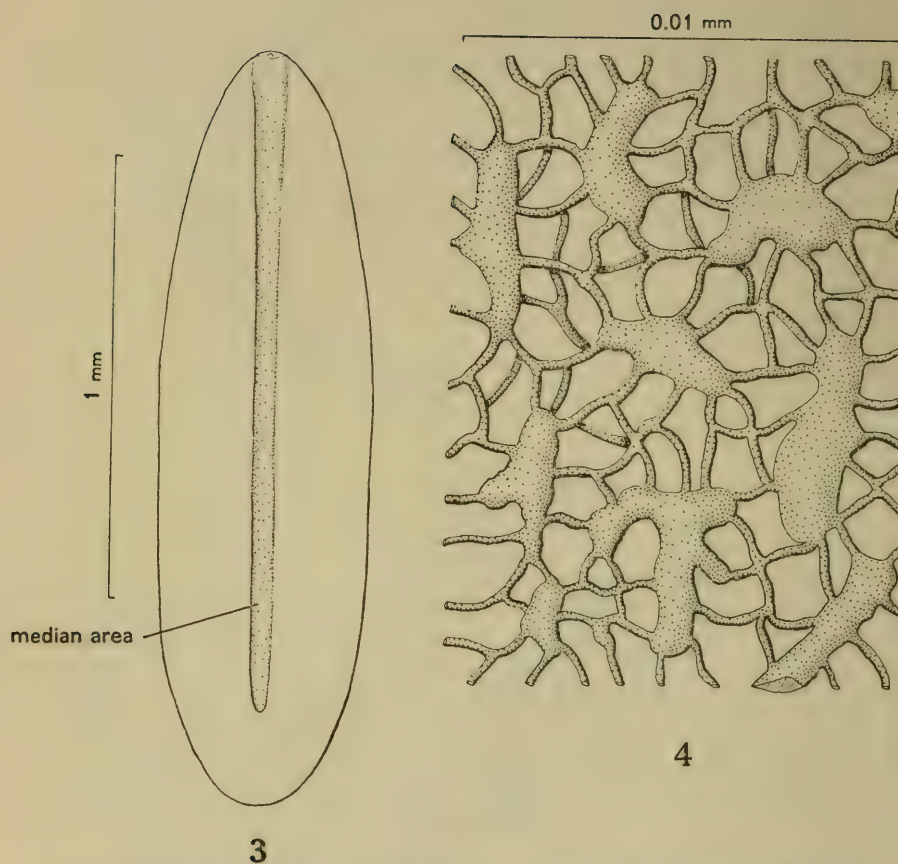
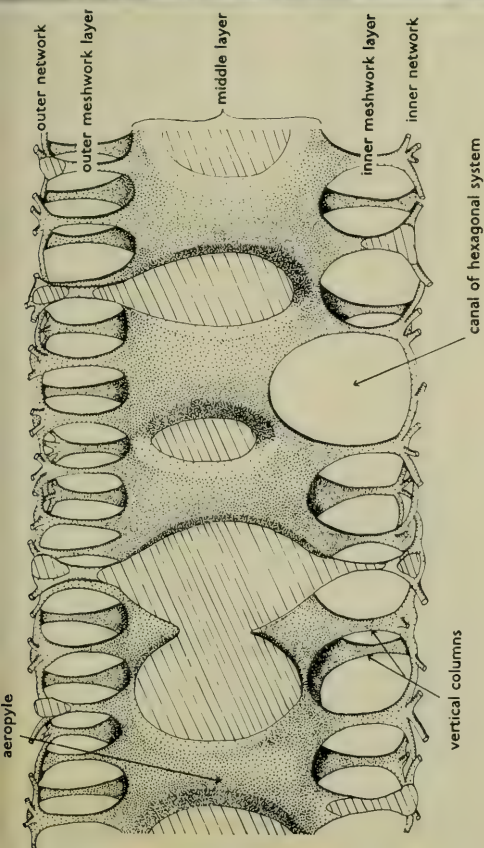


Fig. 1.—Cross section through middle of egg-shell of *Calliphora erythrocephala* Meig. (After Anderson.)

Fig. 2.—*Calliphora erythrocephala* Meig. Transverse section through the right side of the median area between the hatching lines. (After Hinton.)



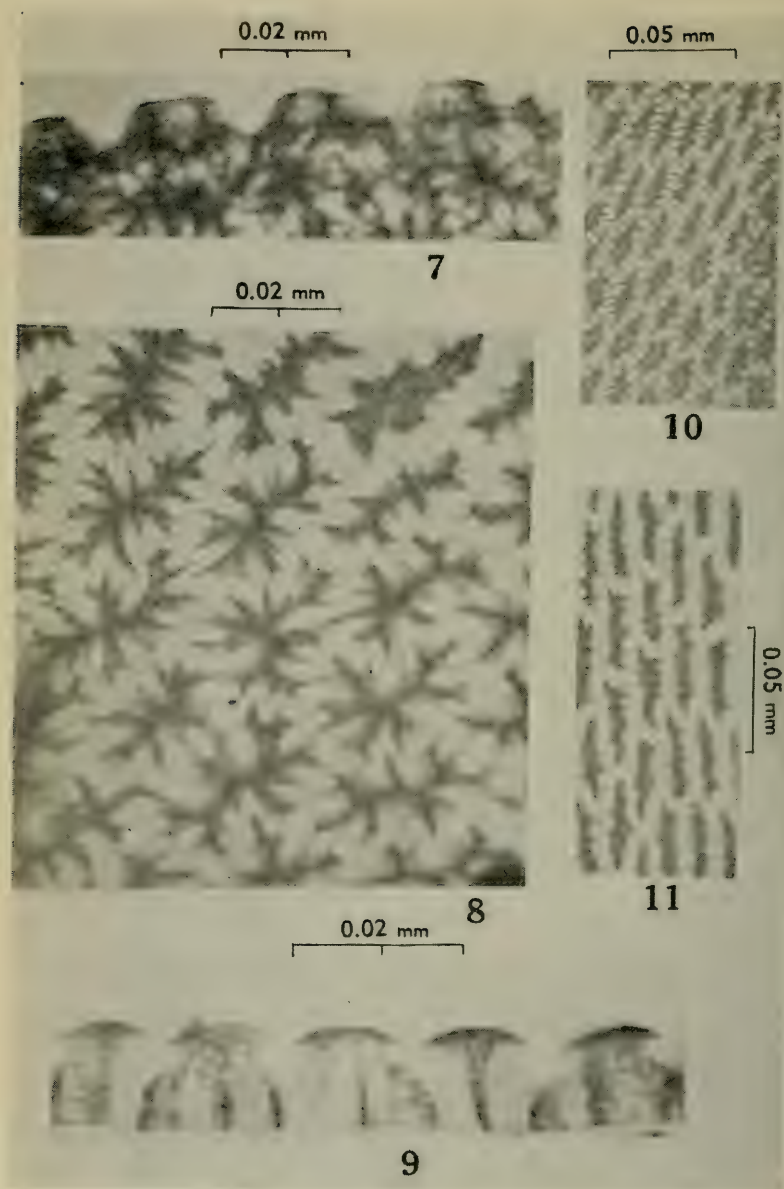
Figs. 3-4.—(3) Dorsal view of the egg of *Calliphora erythrocephala* Meig.
(4) Plastron network of median area between hatching lines of the same species.
(After Hinton.)



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Fig. 5.—*Calliphora erythrocephala* Meig. Surface view of chorion near median area between the hatching lines. Specimen stained with osmium-ethyl gallate.

Fig. 6.—Diagrammatic view of a section through the egg-shell of a 'typical' member of the Muscinae, to show the relations of parts. (After Hinton.)



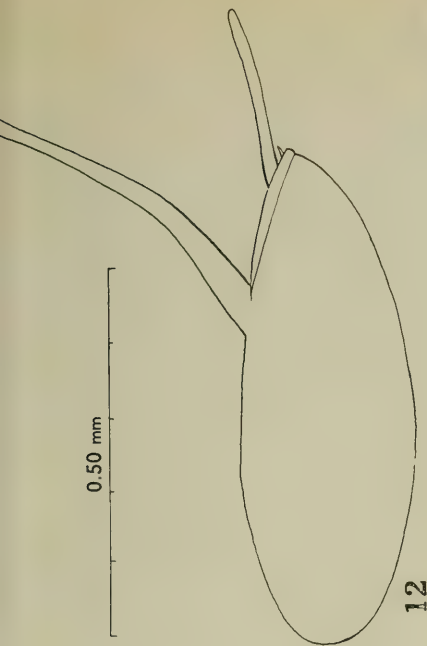
Figs. 7-11.—(7) View of the edge of the shell of *Rhingia campestris* Meig. (8) Surface sculpture at the anterior pole of the same species. (9) Transverse section of the shell of *Helophilus pendulus* L. (10) Surface of the shell of *Eristalis intricarius* L. (11) Surface of middle of shell of *Rhingia campestris* Meig.



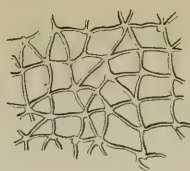
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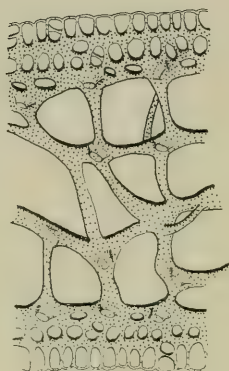
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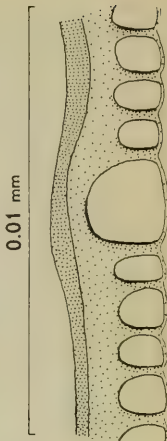
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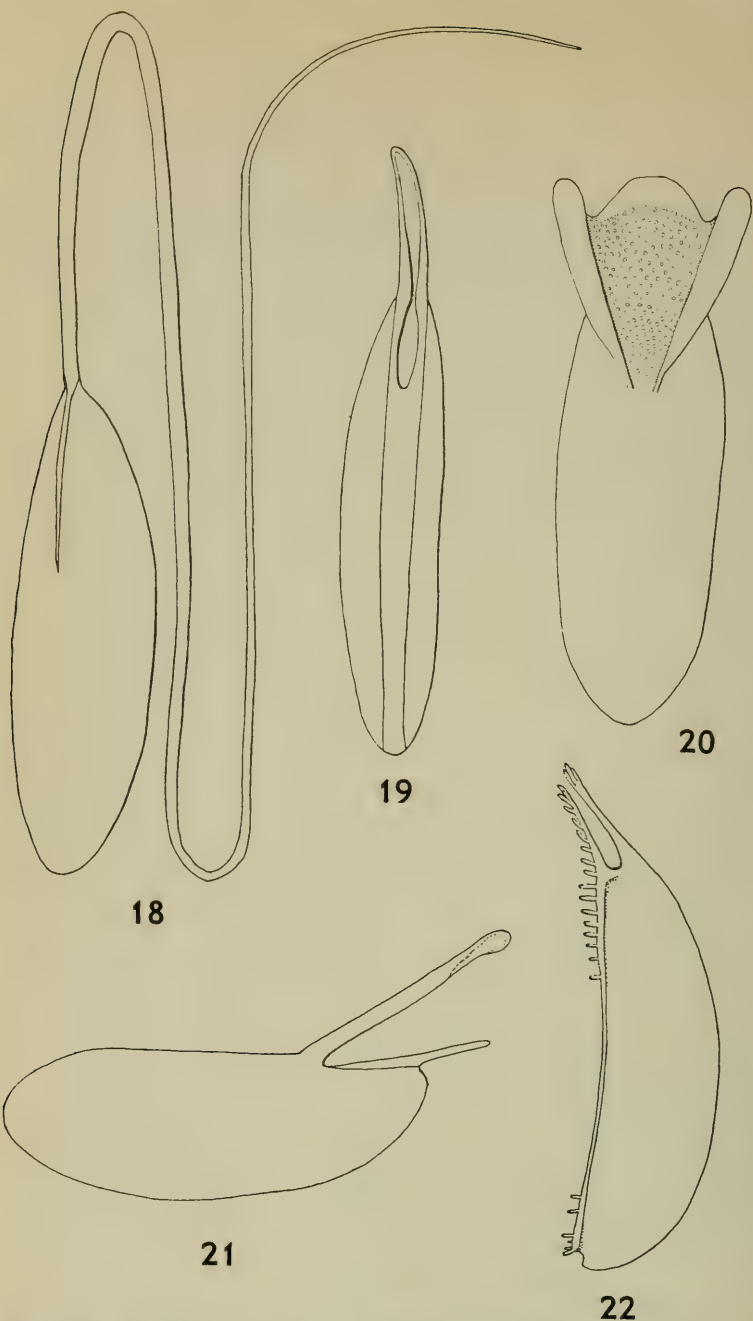


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Figs. 12-15.—(12) Lateral view of right side of egg of *Drosophila* *obscura* Patt. & Main. (13) Longitudinal section through one of the larger respiratory horns. (14) Surface network of apical half of respiratory horn. (15) Section through shell of *Drosophila melanogaster* Teig. (After Hinton.)

Fig. 16.—*Ranatra linearis* L. Respiratory horns of eggs projecting through a floating lily leaf.

Fig. 17.—Ovarian egg of *Oöencyrtus johnsoni* How. (ap) Aeroscopic plate. (b) Apical bulb or apical body. (cp) Body of egg that is inserted into the host. (s) Stalk. (After Maple.)



Figs. 18-22.—(18) Right side of egg of *Sepsis violacea* Meig. (19) Dorsal view of egg of *Musca* (*Eumusca*) *autumnalis* Deg. (20) Dorsal view of egg of *Scopeuma stercorarium* L. (21) Right side of egg of *Dryomyza flaveola* F. (22) Right side of egg of *Hebecnema umbratica* Meig. (After Hinton.)

EDITORIAL NOTES ON NOMENCLATURE

Nomenclature has been a thorny problem for a considerable time, one might almost say since the introduction of the binominal system, without which of course it would be chaotic. The compilation of the Rules of Nomenclature is necessarily complicated, to cover as many eventualities as possible; but this apart, the International Commission on Zoological Nomenclature and its Opinions have really done little to alleviate the position, at any rate so far as entomology is concerned. One can, however, hardly lay the responsibility at the door of the Commission, as it cannot be expected to look for these problems over the whole field of Zoology. Rather one could say that the specialist, or interested entomologist, has failed in this respect in not presenting his problem to the Commission for use of its plenary powers instead of persisting in controversy.

In the independent periodical, where an author can be held to be responsible for his own paper or note, an editor may in doubtful cases leave this responsibility with the author; but in Proceedings and Transactions such as ours, whilst the same line can perhaps be adopted in certain respects with regard to papers, the editor himself writes the account of indoor meetings and uniformity in nomenclature must be maintained. This uniformity must also be extended to field meeting reports; a leader of a field meeting cannot be regarded in the same light as a normal author—he relies for his nomenclature on the reports (often verbal) of those attending his meetings. In the opinion of your editor and those appointed by the Council to work with him in the production of our Proceedings and Transactions, it is also desirable to extend this uniformity to papers; except of course where particular circumstances decree otherwise.

It would appear quite simple to follow the latest list of any group—ordinal, family or even generic—but most lists of any size contain errors of some sort, some more obvious than others, and if we are to correct obvious errors we must, as far as possible, correct the less obvious or even obscure error where it is known. One must also recognise current research and endeavour to keep abreast of it, though this may at times deal with only a part of a genus or perhaps even only a single species.

Since taking office some four years ago, your Editor has been conscious of the need for keeping the nomenclature in our publication uniform and up-to-date; and for some time the feeling has been growing that attention should be drawn to changes from the most recent list that are being adopted for our Proceedings, both as an explanation of these differences from the current list and as an indication (subject to

the results of further research or ruling of the International Commission) of acceptable nomenclature for the future.

The commencement of the publication of a new list of British Lepidoptera with its introduction of a number of variations from the previous list, which itself has caused a certain amount of controversy (as indeed most new lists seem to do), presents an opportunity to commence recording changes which we propose using in our publication. Wherever possible, or necessary, the opinions of authorities or other knowledgeable persons have been considered, and will be of course in the future.

Quite obviously, it will not be possible for the editor to watch all orders of insects in all publications; the editor will be grateful, therefore, to receive a separate of any published paper on entomological nomenclature from the author, or to receive notification of such publication.

F. D. BUCK.

January 1961.

NYMPHALIDAE (Lep.)

The tribe Argynninae in this family appears to require some comment. List compilers in the recent past have overlooked or misinterpreted the work on nomenclature of Reuss (1922-35) and of Warren, B.S.C. (1944, Review of the Classification of the Argynnidi: with a systematic review of the genus *Boloria* (Lepidoptera, Nymphalidae), *Trans. R. ent. Soc.*, **94**: 1-101) which includes consideration of the works of Reuss. Mr. T. G. Howarth has drawn the editor's attention to the following changes clearly indicated by Warren (*loc cit.*) to the Revised Indexed Check List of the British Lepidoptera by Mr. I. R. P. Heslop (1959, *Ent. Gaz.*, **10**: 180):

- No. 40 and No. 41 becomes *Fabriciana cydippe* L. and *F. niobe* L. instead of *Argynnis cydippe* L. and *A. niobe* L.
- No. 42 becomes *Mesoacidalia charlotta* Haw. instead of *Argynnis aglaia* L.
- No. 43 becomes *Issoria lathonia* L. instead of *Argynnis lathonia* L.
- No. 47 becomes *Mellicta athalia* Rott. instead of *Melitaea athalia* Rott.

LYCAENIDAE (Lep.).

There is also a change in the Lycaenidae to which Mr. Howarth has drawn attention. This concerns No. 52 *Thecla quercus* L. which should now be placed in the genus *Quercusia*; *betulae* L. is correctly in *Thecla*.

SPHINGIDAE (Lep.).

The authority for *Celerio galii* should be Schiffermüller and not Rottenburg.

PLUSIIDAE (Lep.).

The changes of some genera from Noctuidae to Plusiidae and others from Plusiidae to Noctuidae in Heslop's recent list as compared with his earlier list underlines the difficulty of satisfactorily separating these two families. With the fact in mind that some authorities consider Plusiidae is not a valid family, and the confusion that may be caused by the change in composition of these two groups, combined with the difficulty for us to show previous family associations, we are regarding all Plusiidae as Noctuidae; relying on Tribe groupings to show affinities within the Family.

HYLOPHILIDAE (Lep.).

Bena fagana F. (*prasina* L. auctt. nec L.) and *Pseudoips prasinana* L. (*bicolorana* Fuess.) are causing some trouble; though, since we quote synonymy, there should be no confusion. This publication has in fact followed Lempke (1947, *Entomologist*, **80**: 128). Mr. W. H. T. Tams informs the present writer that whilst working on the Linnean material he discovered the example bearing the label "prasinana" was a specimen of the Scarce Green Silver-lines, which provided type support to Lempke. However, Lempke (1951, *Cat. Ned. Macrolep.* pt X) withdrew, apparently on de Lattin's suggestion that Linne's description "margine postico . . . fulvis" could not possibly apply to *bicolorana* Fuess. Mr. H. C. Huggins (*in litt.*) believes this may be a case of innocent substitution of labels in the Linnean material, and that in these cases the type requires the support of the description, and not vice versa. He regards the case for the type as "not proven". It would not, however, be the first case where a *lapsus calami* had been responsible for such confusion, and a case of "not proven" is arguable in this direction also. If the argument of innocent substitution of the label on the "type" is seriously considered, then the type is lost; and the selection of a lectotype not only settles the issue, but becomes essential. To reduce changes in the Proceedings to a minimum we shall continue to use *Bena fagana* F. and *Pseudoips prasinana* L. with synonymy as heretofore, at least until the selection of a lectotype or stronger evidence is forthcoming.

NOCTUIDAE (Lep.).

Scotogramma trifolii Hufn., No. 355 in Heslop's List should be according to the information I have from Mr. Tams *Discestra trifolii* Hufn.

Heliophobus reticulata Vill. we have till now considered a synonym of *anceps* Schiff. Boursin disagrees on this point and therefore in Tams' opinion the name should be *calcatrippae* View.

The genus *Caradrina* covering six species in the recent list should in fact include one only of our species. They should be generically grouped as follows: *Caradrina morpheus* Hufn.; *Hoplodrina alsines* Brahm, *H. blanda* Schiff., *H. ambigua* Schiff., and *H. superstes* Ochs.; and *Paradrina clavipalpis* Scop.

Apamea furva Schiff. is shown as forma typica; it is understood that our insect is in fact s.sp. *brittanica* Cockayne, and therefore should be shown as such, otherwise it becomes confusing particularly when continental material is beginning to figure more prominently in our Proceedings.

The genus *Unca* is given for *tripartita* Hufn. and *triplasia* L. which Tams says should be *Abrostola*.

The species are also given incorrectly and should be:

Abrostola triplasia L. (*tripartita* Hufn.) and *A. trigemina* Werneb. (*tripartita* Hufn. auctt. nec Hufn.).

The Heslop list gives *Bomolocha fontis* Thunb. (*crassalis* Treits.) this should be *Bomolocha crassalis* Fabricius (*fontis* Thunb.).

COLEOPHORIDAE (Lep.).

There are several changes in the genus *Coleophora* since the publication of Heslop's *Indexed Check List of British Lepidoptera* in 1947. Straightforward additions are: *C. alnifoliae* Barasch, *C. milvipennis* Zell., *C. binderella* Kollar, *C. teidensis* Wals., *C. clypeiferella* Hofm., *C. versurella* Zell. and *C. granulatella* Zell.

Other recent additions and changes are: *C. albicornuella* Bradley, which until the discovery of the true *C. paripennella* Zell. in Britain appeared in our lists as that species; *C. politella* Scott which in the past has erroneously been considered synonymous with *C. binderella* Koll.; and *C. nemorum* Heine which appeared in the 1947 list as *C. ardeaepennella* Scott.

An addition with somewhat more complicated synonymy is *C. peribenanderi* Toll.; a species we have confused with *C. therinella* Tengst. Mr. J. D. Bradley has been good enough to give the following synonymy:

Coleophora peribenanderi Toll.

(*benanderi* Toll. nec Kanerva)

(*Eupista therinella* Tengst., Pierce et auct. nec Tengst.).

Coleophora therinella Tengst. remains on our list.

Two changes in nomenclature as appears in the 1947 list concerns *C. caespititiella* Zell. and *C. agrammella* J.H.W. The former should now appear as *C. alticolella* Zell. (*caespititiella* Zell. auct nec Zell.); whilst the latter should be *C. caespititiella* Zell. (*agrammella* J.H.W.). Thanks are due to Mr. R. W. J. Uffen for much of this information.

BOOK REVIEWS

Les Insectes II. (Hyménoptères Lépidoptères, Rhynchotes, Diptères).

By Paul-A. Robert. Delachaux & Niestlé S/A, Neuchatel.

This book is of a size similar to our Wayside and Woodland series and is admirably suited to the pocket. It is a model for presentation of a scientific subject to the interested layman and the author has treated his readers as intelligent beings, capable of taking an interest in the subject, even though the repast is neither pre-digested nor spoon fed. The obscure small orders have been omitted as being unlikely to attract the ordinary nature-lover. The introduction gives a diagram of insect anatomy, enabling the reader to take in what is said about the orders treated. This is followed by a simplified key to the major orders of insects so that insects noted may be referred to their correct orders without undue difficulty but none the less with the exercise of thought. There follows information on life cycle and collecting, and also touches on scientific names, but while these are mentioned with the species in the descriptive text later on, and the reader is made aware of their importance, the matter is not overdone, and popular names are used, but these bear a much closer relation to the scientific names than do the popular names so insidiously infiltrating into British popular literature. Thus, *Anthidium manicatum* is referred to as L'Anthidie, and our welcome visitor *Deilephila euphorbiae* L. is Le Sphinx de l'Euphorbie.

There are 32 beautifully accurate coloured plates by the author illustrating selected insects *in situ*, and there are many text figures to help the reader.

The Hymenoptera are the first order to be treated, and after general remarks on the order, the chapter is sub-divided into sections covering the main families. The Lepidoptera follow, and these are skilfully treated and the families exemplified by well selected species; the micro families receive their share of attention, as, of course, they should. The Rhynchota follow, well illustrated by examples of land and water bugs well known to most of us, including plant lice and hoppers, and finally the Diptera are treated, with a very fair share of the fine plates, including a cleg enlarged to a size which might make one fear exsanguination by a swarm of them! The last chapter covers the ravages and, be it noted, the utility of insects.

This is a book which could well find a place in the pocket of the nature lover visiting the continent. The French text is beautifully lucid and can be read and understood by anyone with a reasonable understanding of the language.

S. N. A. J.

British Flies. Vol. VI, Empididae. Part I. Tachydrominae. By J. E. Collin. 8vo., pp. viii and 219. 73 text figures. Cambridge: Cambridge University Press. 1961. Price 30/-.

Francis Walker's *Insecta Britannica*, 3 volumes, of 1851-1856, gave us the only work in the English language that has attempted to describe all the Diptera of this country; 2,074 species were described. G. H. Verrall proposed a series of volumes, and produced *British Flies*, Vol. VIII, *Platypezidae*, *Pipunculidae* and *Syrphidae* on 1st January 1901 and Vol. V, *Stratiomyidae*, etc., on 1st January 1909.

Mr. Collin's work is the first of three parts of Volume VI of that series. The first volume to fill the gap after 52 years! The author, a nephew of Verrall, drew the figures for his uncle's volumes and made the original drawings for those in this 1961 volume. He was elected to the (Royal) Entomological Society of London on 15th February 1899, a fortnight after the election of the late H. W. Andrews. His first diptera note appeared that year in the *Entomologists' Monthly Magazine*, whose editorial board he joined in 1906, serving to January 1945. Verrall introduced several species of Empididae to the British List, and on his death, Mr. Collin continued to add species. His main paper on the British Empididae was a serial in the *Ent. mon. Mag.*, 1926-7, when he described 82 species and subspecies new to science. This helped British dipterists who were basing their identifications on the English descriptions in W. Lundbeck's 1910 volume on the Danish Empididae.

Now we have this first part from the pen of one who has, for 50 years, dominated British dipterology and has been one of the great international figures in entomology during this time. The Empididae have been his main interest and he has described many exotic species, but nevertheless 139 species or varieties of other families of diptera bear Collin's name as describer, in Kloet & Hincks *Check List of British Insects*.

In this part of the empid volume, 12 species and one subspecies from this country and one from abroad, are described as new. Each genus has a figure of a complete fly but most of the figures are of genitalia. These include a novel linking of 2-3 views to emphasise the shapes of each part. It is, we believe, the author's practice to isolate his new species by genitalia differences and then seek reliable diagnostic characters that can be more easily recognised, before preparing his keys. The genera are briefly described before the key to each genus. Each species is treated first with a brief description, the date and title of the original publication is mentioned followed by the detailed description. This is not so long as that by Verrall who used 3,600 words for the common Cleg, whilst Collin needs but 677 for *Sicodus arrogans* L. Next comes a brief comment, often a comparison with closely related species, followed by a few lines covering habits, distribution in Britain, dates of flight of the adults and finally a note on synonymy.

Unlike the two volumes by Verrall and the method used by Lundbeck, the descriptions of the species, which are numbered, do not follow the

same order as the keys. The numbering in the keys permits the description to be quickly located. This is necessary if only to obtain the full name, for authors' names are omitted in the keys. The index will be appearing with the third part.

The author indicates in the text 239 species out of the 354 British Empididae, of which he has seen the original types.

One can but admire the excellence of the work as a whole. The product of a lifetime study of one who is a great field naturalist, a distinguished amateur systematist and an authority on nomenclature and its laws. The result of a study of collections from all over the world and particularly of this country. The only regret is for the slimness of the space allotted to habits and distribution. The data given seem sometimes to be an indication rather than a complete appreciation, as specimens bearing 'det. J. E. Collin' from counties not mentioned by the author are in several collections.

Mr. Collin gives some explanation of his descriptive terms and of his choice of system of venation nomenclature, with figures for the last. It is felt, however, that a full illustrated glossary would have been most helpful. It would have encouraged many to choose this family of flies that have such interesting habits, with which to commence the study of Diptera. This would, of course, have increased the size and cost of production. As it is, the price is modest and obviously should contribute to the encouragement of Diptera studies.

Of the printing, production and proof reading, the highest praise is due. The volume is probably one of the finest British entomological monographs published.

L. P.

British Flies. Vol. VI. Empididae. Part II. Hybotinae, Empidinae (except Hilara). By J. E. Collin. 8vo., pp. 223-551. Figs. 74-205. Cambridge: Cambridge University Press. 1961. Price 30/-.

This second part has followed promptly on the first, in the same excellent manner and at the same modest price.

As before, each genus is illustrated by a front view of the head and a side view of a whole insect, except of the genera *Syndyes* and *Trichinomyia*. But the 132 figures consist of 287 drawings and cover most of the species described. It is pleasing to see the acknowledgement given to the artist J. H. Burman for the beautifully drawn wing of *Syneches muscarius* F. which with *Syndyes nigripes* Zett. were first discovered in this country in 1954 and 1953 respectively.

Four new species are described, three from this country and one from Italy. *Bicellaria vana* Collin, *Empis bicuspidata* Collin and *E. planetica* Collin are now accepted as full species. There are a few other changes of names etc. and an acceptance of Tuomikoski's genus *Trichinomyia* for *flavipes* Mg., removed from *Trichina*.

The passage of time since Verrall's two volumes of the series is emphasised by the reminder that *Platynema pulicaria* Fln., regarded by Verrall as a Platypezid in 1901, has since become an Empid under the name of *Atelestus pulicarius* Fln. and thus appears in two volumes.

The author pays tribute to R. Frey's grouping of the species of *Rhamphomyia* but does not accept all his subgenera. One is struck by the status given to the subgenera of *Empis* and *Rhamphomyia*. Mr Collin uses the subgeneric name as a generic one in his comments following the specific descriptions and each subgenus is numbered as a genus.

The synonymic notes, showing the amount of study given to the many types scattered over the European collections, are most informative. Often these notes give instructive commentary on the International Rules of Zoological Nomenclature and the note on Meigen's 1800 names on page 238 is typical of the author's views.

There are more bionomic details in this part. Naturally, fewer terms are defined, but it is felt that it would have been useful to have those given at the end of the Hybotinae section, illustrated by figures.

Two small corrections—my capture of *Empis concolor* Verr. was at Headley, Surrey, not Sussex (I have since taken it at Panshanger, Herts. on 29th June, 1952). The other point—*Rhamphomyia hirtula* Zett. was taken by I. H. Burkill, the well known Kew botanist who has studied flower pollination by insects so long and so successfully.

Undoubtedly this work will enable collectors to extend our knowledge of the distribution and habits of the members of this very interesting family.

L. PARMENTER.

Butterflies. By Arthur Smith and Vernon Shearer. 7½" × 9". 22 pp., Harmsworth, Penguin Books Ltd., Puffin Picture Book, No. 115, 1961. Price 7s. 6d.

This is a book for children; and as a book to introduce children to our British butterflies, it is an outstanding work. Most of our species, including a full life history of the Swallow-tail Butterfly, are illustrated in colour, beautifully drawn and competently printed. Many are shown in natural positions with the plants reduced to delicate black and white. Other black and white illustrations show ova greatly enlarged and ova, larvae, pupae and imagines *in situ*; also parasites and the basic parts of the larva, pupa and imago.

Although described as a picture book, and this is its prime function, there is sufficient text to describe life history, to deal with the egg, caterpillar, chrysalis and adult. The life history of the Large Blue is given and illustrated, in this case after Frohawk, which one would think a little out of place in a work of this nature. It would soon come to the child's notice if the subject proved of sufficient interest to cause further enquiry.

Local rarities receive attention, but not the excessive attention that one finds usually given to them; and hibernation, parasites,

vagrant rarities and aberrations are all introduced. Rearing butterflies is also briefly dealt with and inside the front cover is a table showing the periods of the year when most of our butterflies are on the wing.

The text is very well written in a language that children can understand and much personal investigation has been undertaken by the authors to ensure accuracy.

A first-rate book, well worth three half-crowns, and one which will delight our children, nephews and nieces.

F. D. B.

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The Society has for its objects the promotion and advancement of research in Biological Science, and its diffusion by means of meetings at the Society's Rooms for the reading of original papers, discussions and lectures, by public exhibitions, by field meetings, by the issue of publications, the formation of typical collections and of a library, and by such other means as the Council may from time to time determine.

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1897	R. ADKIN, F.E.S. (dec.).	1949	J. O. T. HOWARD, M.A. (dec.)
1898	J. W. TUTT, F.E.S. (dec.).	1950	Air-Marshal Sir ROBERT SAUNDBY, K.B.E., C.B., M.C., D.F.C., A.F.C., F.R.E.S.
1899	A. HARRISON, F.L.S. (dec.).	1951	T. G. HOWARTH, B.E.M., F.R.E.S F.Z.S.
1900	W. J. LUCAS, B.A., F.E.S. (dec.).	1952	E. W. CLASSEY, F.R.E.S.
1901	H. S. FREMLIN, M.R.C.S., L.R.C.P., F.E.S. (dec.).	1953	F. STANLEY-SMITH, F.R.E.S.
1902	F. NOAD CLARK (dec.).	1954	STANLEY N. A. JACOBS, S.B.St.J., F.R.E.S.
1903	E. STEP, F.L.S. (dec.).	1955	F. D. BUCK, A.M.I.Ptg.M., F.R.E.S
1904	A. SICH, F.E.S. (dec.).	1956	Lt.-Col. W. B. L. MANLEY, F.R.E.S.
1905	H. MAIN, B.Sc., F.E.S. (dec.).	1957	B. P. MOORE, B.Sc., D.Phil., F.R.E.S.
1906-7	R. ADKIN, F.E.S. (dec.).	1958	N. E. HICKIN, Ph.D., B.Sc., F.R.E.S.
1908-9	A. SICH, F.E.S. (dec.).	1959	F. T. VALLINS, A.C.I.I., F.R.E.S.
1910-11	W. J. KAYE, F.E.S.	1960	R. M. MERE, F.R.E.S.
1912-13	A. E. TONGE, F.E.S. (dec.).	1961	A. M. MASSEE, O.B.E., D.Sc., F.R.E.S.
1914-15	B. H. SMITH, B.A., F.E.S. (dec.)		
1916-17	Hy. J. TURNER, F.E.S. (dec.).		
1918-19	STANLEY EDWARDS, F.L.S., etc. (dec.).		
1920-21	K. G. BLAIR, B.Sc., F.E.S. (dec.)		
1922	E. J. BUNNETT, M.A. (dec.).		
1923-4	N. D. RILEY, F.Z.S., F.E.S.		
1925-6	T. H. L. GROSVENOR, F.E.S. (dec.).		
1927-8	E. A. COCKAYNE, D.M., F.R.C.P., F.E.S. (dec.).		

COUNCIL'S REPORT FOR 1961

In this extremely busy year, during which much time and thought has been given to the possibility of changing the name of the Society, there has been one item almost unnoticed that has made the period unique in the annals of the Society. For the first time in our history our membership has been over 500 throughout the entire period; the total at 31st December stood at 539 and comprised 4 Honorary, 4 Special Life, 13 Life, 221 Ordinary, 258 Country, and 39 Junior Members. During the year five members died. Two were past presidents of the Society, Mr. L. T. Ford whose valuable contributions to the biology of microlepidoptera did much to foster the rapidly increasing interest in that group, and Mr. J. O. T. Howard who died after a short illness and was in many ways a generous benefactor to the Society. Sir Leonard Wakely was well known and frequently attended our meetings. The deaths of Dr. J. Michaud and Mr. A. Valentine were reported towards the end of the year. All five will be greatly missed. Thirty-eight new members joined the Society in 1961, 12 resigned, and 4 whose subscriptions were overdue were struck off.

The subject which has occupied much of your Council's time during the year has been the vexed question of whether the name of the Society should be changed. This matter had been raised during the previous year and a circular seeking the opinion of members had been sent out. The response to this circular was so inconclusive that the Council felt that it did not give them the guidance they needed. It was decided to send out a referendum, with a prepaid return envelope, to all members except those resident abroad. A member of the Council offered to bear the expense so that no cost fell on the Society, and to him our grateful thanks are due.

Approximately 500 copies were sent to members and 359 replies were received; 229 of these favoured a change of name, 121 were against any change and 9 papers were unmarked. There was a clear preference for the name "The British Entomological and Natural History Society".

Accordingly, your Council called a Special Meeting for 28th September 1961, at which the following was moved: "The designation—The South London Entomological and Natural History Society—shall be discontinued as from midnight on 31st December 1961 and be replaced by—The British Entomological & Natural History Society". This motion was lost by 32 votes to 23, and the name of the Society remains unchanged.

During the year a committee was appointed by the Council to make proposals for bringing the Society's Bye-Laws up to date. The amendments proposed by this committee were approved by your Council and accepted at the Special Meeting held on 28th September. They will be printed in due course. The amendments were routine and require no

comment except in two instances. For some years now Ordinary and Country Members under the age of 21 have paid the same reduced subscription. It was decided to simplify the position and to permit all those under the age of 21 to become Junior Members at a subscription of 10/- per annum. It was also decided that in these days of improved travel facilities, it was unfair that members who lived in the country but attended regularly at business in the London area should have the advantage of Country Membership of the Society, and the requirements for country membership were amended accordingly.

The Annual Dinner on Friday, 27th October, was again held at the Grosvenor Hotel, and the 73 members and guests who attended had a most enjoyable evening.

The Annual Exhibition was held on the following day, Saturday, 28th October, when some 295 members and guests attended. We must again thank The Royal Society and the Geological Society for placing their rooms at our disposal on this occasion. There were slightly more exhibits than in previous years and the subject for special attention, "Entomological Illustration" produced some very fine drawings and paintings as well as numerous coloured slides. In previous years dissatisfaction had been expressed over the tea served at the exhibition. However, the tea provided by the new caterers, despite the increase in cost to 3/6d, was greatly appreciated. Finally, our thanks are due to those who spent the day in helping with the administrative details, selling Christmas cards and other unspectacular duties, to whose unselfish devotion much of the success of the exhibition is due.

Twenty-one ordinary meetings were held during the year in the rooms of the Junior Institution of Engineers to whom our thanks are due for their help and co-operation during the past year. The programme was again arranged by Mr. Howarth and a notable addition was the meeting at the Linnean Society where Mr. Tams gave an introductory talk on the Linnean collection which was open to inspection.

An attractive programme of field meetings was arranged by Mr. Uffen and it is a pity that in many cases these were so poorly attended. Our thanks are due both to him and to those members who led meetings and submitted reports, and also to Mr. and Mrs. Odd, who once more kindly provided tea in their home after the Pulborough Field Meeting.

The Society once again produced a Christmas card. As a result of previous criticism a special effort was made to produce a cheaper card. The card was produced to sell at 6d. and this year a small profit was made. The drawing of the Comma butterfly at rest was presented by Mr. A. Smith, to whom we express our gratitude.

Owing to various difficulties, the Proceedings and Transactions for 1960 did not appear until December. They contained xxxix + 188 pages, 8 plates (2 coloured) and 4 text figures. The coloured plates illustrate Part V of Mr. G. Haggett's *Larvae of the British Lepidoptera not figured by Buckler*. Your Council gratefully acknowledges the receipt through the Royal Society of a Parliamentary grant-in-aid of £125

towards the cost of the volume but it was specifically stated that the grant was not to be used for the coloured plates.

The list of members has been brought up to date as at 26th June 1961 but for reasons of expense the Geographical list has been discontinued. Owing to the continued rise in cost of production of the Proceedings and Transactions it has been decided that in future the Members list will be published as a separate every three years.

During the year the honorary lanternist, Mr. Christie, informed your Council that owing to business commitments he would be unable to continue in office. We take this opportunity of thanking Mr. Christie for his past services. Mr. Denvil has succeeded him. The Society's collection of 2" x 2" colour transparencies continued to grow during the year. Additions to the collection were received from Miss C. A. McDermott, and Messrs. J. E. Knight and M. W. F. Tweedie to whom the best thanks of the Society are due for their generosity.

The Hon. Curator reports that twenty cabinet drawers in two of the Hill units have been repapered to take the Leston Collection. One of the Society's old cabinets has been disposed of at a reasonable price. The following members have presented specimens: Messrs. H. G. Denvil (Diptera), A. E. Gardner (Odonata), and R. S. Tubbs (Diptera). The thanks of the Society are due to these members for the valuable additions to our collections.

The Hon. Librarian reports that the publication of "A Catalogue of Books in the Library" has stimulated interest. Members have noticed gaps and have presented many books, errors and omissions have been pointed out and more books have been borrowed. Our thanks are due to all who presented works to the library, and particularly to Mr. F. T. Vallins for the magnificent gift of some 42 volumes on the modern views on evolution. So that members may be kept aware of the contents of the Library a list of additions during 1961 is given. A note of how the item was acquired is placed in parentheses.

Peters, W., 1952, *A Provisional Check-List of the Butterflies of the Ethiopian Region* (E. W. Classey); Haworth, A. H., 1802, *Prodromus Lepidopterorum Britannicorum*, a facsimile copy (E. W. Classey); *Victoria County History*, 1920, *Surrey, Section Zoology* (E. W. Classey); Fraser, F. C., 1957, *A Reclassification of the Order Odonata* (The author); Fraser, F. C., 1956, *Faune de Madagascar I, Insectes Anisopteres* (The author); Schmidt, Erich, 1951, *The Odonata of Madagascar, Zygoptera* (F. C. Fraser); Boorman, John and Roche, Patrick, 1957 and 1959, *The Nigerian Butterflies, Papilionidae and Nymphalidae* (S. N. A. Jacobs); Imms, A. D., 1959, *Outlines of Entomology* (F. T. Vallins); South, R., 1921, *The Butterflies of the British Isles* (H. G. Tunstall); Miall, L. C., 1895, *The Natural History of Aquatic Insects* (H. G. Tunstall); Turrill, W. B., 1948, *British Plant Life* (H. G. Tunstall); Dennis, R. W. G., 1960, *British Cup Fungi and their Allies* (A. M. Masee); Britton, Harry, 1943-46, *The Coleoptera of the Isle of Man* (J. L. Henderson); Marsh, J. C. S., 1960, *Hong Kong Butterflies* (M. W. F. Tweedie); Hannemann, H. J., 1961, *Tortricidae* (purchased);

Robert, Paul A., 1946, *Les Insectes*, Vol. II (review copy); Craveri, M., 1938, *Atlante Entomologica (esclusi i Lepidotteri)* (P. M. Pollak); Morrell, R., 1960, *Common Malayan Butterflies* (M. W. F. Tweedie); China, W. E., and Miller, N. C. E., 1959, *Check-List and Keys to the Families and Subfamilies of the Hemiptera-Heteroptera* (purchased) Collin, J. E., 1961, *British Flies Empididae*, Parts I and II (review copy); Stoll, N. R., 1961, *International Code of Zoological Nomenclature* (review copy); Thorpe, W. H., 1961, *Bird-Song* (review copy).

The following were presented by Mr. F. T. Vallins: Avinoff, A. and Sweadner, Walter R., 1951, *The Karasana Butterflies, A Study in Evolution*; Bateson, W., 1913, *Mendel's Principles of Heredity*; Beale, G. H., 1954, *The Genetics of Paramecium aurelia*; Bonner, John Tyler, 1958, *The Evolution of Development*; Brown, R. and Danielli, J. F. (editors), 1953, *Evolution. Symposia of the Society for Biology*; Bucksbaum, Ralph and Milne, Louis, J., 1960, *Living Invertebrates of the World*; Cain, A. J., 1954, *Animal Species and their Evolution*; Carter, G. S., 1951, *A General Zoology of the Invertebrates*; Carter, G. S., 1954, *Animal Evolution. A Study of Recent Views of its Causes*; Darlington, C. D., 1958, *Evolution of Genetic Systems*; Darlington, C. D. (editor), 1953, *Symposium on Chromosome Breakage*; de Beer, G. R. (editor), 1938, *Evolution, Essays on Aspects of Evolutionary Biology*; Dobzhansky, Theodosius, 1957, *Genetics and the Origin of Species*; Dowdeswell, W. H., 1952, *Animal Ecology*; Dowdeswell, W. H., 1958, *The Mechanism of Evolution*; Elton, Charles S., 1958, *The Ecology of Invasions by Animals and Plants*; Fisher, Ronald A., 1958, *The Genetical Theory of Natural Selection*; Ford, E. B., 1949, *Mendelism and Evolution*; Hurst, C. C., 1932, *The Mechanism of Creative Evolution*; Huxley, Julian, 1942, *Evolution, The Modern Synthesis*; Huxley, Julian (editor), 1940, *The New Systematics*; Huxley, Julian, Hardy, A. C., and Ford, E. B. (editors), 1954, *Evolution as a Process*; Jeans, James H. and others, 1925, *Evolution in the Light of Modern Knowledge*; Lack, David, 1947, *Darwin's Finches*; Mayr, Ernst, 1949, *Systematics and the Origin of Species*; Moore, Ruth, 1955, *Man, Time and Fossils*; Newbiggin, Marion I., 1950, *Plant and Animal Geography*; Patterson, J. F. and Stone, W. S., 1952, *Evolution of the Genus Drosophila*; Pilát, Albert and Usák, Otto, 1959, *Mushrooms*; Ramsay, J. A., 1957, *Physiological Approach to the Lower Animals*; Rensch, Bernard, 1959, *Evolution above the Species Level*; Riley, H. P., 1948, *Introduction to Genetics and Cytogenetics*; Roe, Anne and Simpson, George Gaylord (editors), 1958, *Behaviour and Evolution*; Savory, Theodore, 1959, *Instinctive Living*; Schmalhausen, I. I., 1949, *Factors of Evolution. The Theory of Stabilizing Selection*; Sheppard, P. M., 1958, *Natural Selection and Heredity*; Shull, A. Franklin, 1959, *Evolution*; Simpson, George Gaylord, 1949, *Tempo and Mode in Evolution*; Waddington, C. H., 1956, *An Introduction to Modern Genetics*; and White, M. J. D., 1948, *Animal cytology and Evolution*.

Many separates and lists have been given to the Society and we continue to receive the usual journals.

TREASURER'S REPORT FOR 1961

It is always a pleasure to be able to give a satisfactory report on the Society's finances at the end of a year, and I am glad to say the income in 1961 was sufficient to cover all expenses without resorting to accumulated revenue. While we owed our Creditors some £47 less than at the beginning of the year we had £23 more ready Cash.

BALANCE SHEET

Our Investments remain unchanged. In Cash we had £654 at the end of the year, most of it on deposit. On the other side the Special Funds are increased by £40, and the small surplus of Income brings the amount of Accumulated Revenue to £389 13s 9d. Council decided to increase the amount of Insurance on the Society's library of books and the cabinets and other furniture, which are now covered for £5,000, the other items of insurance remain unchanged.

INCOME AND EXPENDITURE ACCOUNT

Receipts for the year, apart from interest on investments belonging to the Special Funds, and donations, etc., to them, amounted to £760, which is £27 more than in the previous year, and this increase was in the Subscriptions collected (current and arrears). After paying out of this our various expenses, which were remarkably similar to those of 1960, there was left sufficient to transfer the £405 needed in the Publication Fund, £40 to the Library Fund (which had to go without any transfer from Income last time), and we still had left a surplus of nearly six pounds to carry forward.

CAPITAL ACCOUNT

There is an addition of £25 here: the proceeds of the sale of one of the older insect cabinets.

LIBRARY FUND

This fund started with a balance of £53 at the beginning of the year; donations for book-binding amounted to £21 15s., and the Entrance Fees of thirty-eight Members, together with the £40 from Current Revenue mentioned above, made the sum of £129 available to the Librarian. Out of this, £51 was spent on books, periodicals, binding, and slides, leaving a balance of £78 13s 9d.

HOUSING FUND

This being an accumulating Fund, I have shown it differently from the other Accounts. Additions during the year were £5 10s 6d in donations; £7 10s, interest on Savings Bonds; and £2 8s, deposit in-

terest, making the total to date £259 7s 6d, of which £178 17s 6d is invested.

PUBLICATION FUND

The fund that swallows the greater part of our income. But this year the demand has not been quite so heavy.

The 1960 issue of "Proceedings and Transactions" cost £20 less than that for 1959. The Royal Society allocated £125 from the Parliamentary Grant-in-Aid to this issue. Sales of "Proceedings", "Guide to the Smaller British Lepidoptera", Christmas cards, and other items which belong here, were all a little higher than in the previous year; so that the amount needed to pay the Printers could all be found from the year's income.

In a footnote to his Report last year the Treasurer pointed out the advantages of the use of **BANKERS' STANDING ORDERS** for the annual payment of Subscriptions.

This note produced gratifying results. The matter is mentioned again because there is still quite a number of Members who have not yet availed themselves of the advantages of this method of remitting their dues.

Capital Fund—					
General	...	...	£2,436 18 1		
Publication	...	...	304 19 9		
Housing	...	...	178 17 6		
			£2,910 15 4		
Special Funds—					
Library	...	...	£78 13 9		
Publication	...	...	1 4 10		
Housing	...	...	80 10 0		
Subscriptions paid in advance	...	...	...	160 8 7	
Sundry Creditors	...	...	...	36 13 0	
Income and Expenditure Account—				480 7 6	
Balance at 1st January 1961	...	...	£332 15 11		
Add Excess of Income over Expenditure for the Year	...	...	5 17 10		
				338 13 9	
<p><i>Note.</i>—The Society's Books, Cabinets, Furniture, etc., are insured for £5,000, and the Hon. Secretary's Office Equipment for £100. The Society is also insured against Public Liability risks in the sum of £10,000.</p>					

Investments at Cost—					
General (including Ashdown, Lachlan - Gibb, Lile, Robert Adkin, Fountaine, Hugh Main, Labouchere, Cockayne, Rait-Smith and Hawgood bequests).	...	...	£545 11 6		
£591 15s 3d 3½% Conversion Stock	...	...	417 17 0		
£600 0s 0d 2½% Consolidated Stock	...	...	703 13 4		
£850 0s 0d 4% Consolidated Loan	...	...	500 0 0		
£500 0s 0d 4½% Defence Bonds	...	...	271 16 0		
£400 0s 0d 3½% War Stock	...	...	350 0 0		
£350 0s 0d 5% Defence Bonds	...	...	
Publication (gift of the late Misses E. F. and L. M. Chapman in memory of their brother).	...	...	304 19 9		
£300 0s 0d 3½% War Stock	...	...	
Housing (including gift of Edgar Hare in memory of Edward Step).	...	...	178 17 6		
£250 0s 0d 3% Savings Bonds, 1965-75	...	...	£3,272 15 1		
<p><i>Note.</i>—Market Value at 31st December 1961—£2,471.</p>					
Cash at Bank—					
Deposit Account	...	...	549 17 1		
Current Account	...	...	86 9 8		
Cash in hand	...	...	...	636 6 9	
			...	17 16 4	
				£3,926 18 2	

Audited and found correct,

R. M. MERE,

G. STUGHTON-HARRIS, F.C.A.

25th January 1962.

J. L. HENDERSON, Hon. Treasurer.

OBITUARY

JOHN OLIVER TUNLEY HOWARD

(1905-1961)

A large number of members must have felt a real sense of personal loss on learning of the passing of Oliver Howard on 12th October, 1961, at the age of 56. He was born on 11th April, 1905, the son of Walter Howard who, with his family, lived at Hampstead for many years. He attended our meetings regularly and took such an interest in all the affairs of the Society that this grievous event seemed hard to realise. Only the previous May he was planning, with his usual enthusiasm, a trip to Shetland, but soon this enterprise had to be abandoned when grave illness overtook him and though he rallied for a time, his health steadily deteriorated and he eventually succumbed, mercifully with little suffering.

Howard joined our Society in 1927 and served on the Council several times. He had been Assistant Editor of our Proceedings and was our President in 1949. Many will remember his illuminating and scholarly Address on the history of Entomological Literature, for he was well versed in every aspect of Natural History and the literature connected with it. He was a recognised and eminent authority on old and rare books of which he had a fine library. In quite early days he joined the well-known firm of Bernard Quaritch and was one of its directors at the time of his untimely death.

But it was as a keen and energetic field collector of Lepidoptera that we knew him best. The flair for this pursuit first seized him when he was at Sandroyd School where he was encouraged to chase fox moths on Oxshott Common. When at Repton and later at Trinity College, Cambridge, he continued to the full his interest in this favoured pastime. After leaving the University he used to collaborate a great deal with his close friend, the late John Bowes who lost his life during the early part of the War. They made expeditions together to many noted haunts and in particular to the Highlands whence they brought back most of the local specialities. On one such trip, Howard obtained some of the finest *Alcis* (*Cleora*) *repandata* L. f. *conversaria* Hübn. ever recorded. The writer first met him in 1930 in Wicken Fen and has many happy memories of collecting with him. These numerous journeys were interrupted during the War period when he served in the R.A.F. Coastal Command as a Squadron Leader. He was at first based on Gibraltar at the time of the North African Landings in 1942. Soon afterwards he was posted to Ceylon and then to India where he remained for a considerable period. It was while in this area that he was stranded during a



J. O. T. HOWARD, M.A.

flight on one of the remote atolls in the Indian Ocean and spent quite a lot of his time there collecting the local Lepidoptera which comprised some choice species, most of which he generously presented to the National Collection at South Kensington.

A few years after the War he and his wife went to live in the fine hilly country above Dorking overlooking Box Hill. Here he had ample opportunity of furthering his keenness for gardening, especially the growing of rhododendrons, and also for running a mercury vapour light trap there to advantage. Over the years it attracted several species new to the district and in 1955 he had the good fortune to take in it a *Celerio galii* Schiff. from which he bred a superb series. In fact he was a very good breeder of many other scarce species. During these post-war years his enthusiasm never faltered and during his holidays he made trips almost every year to noted spots or to some of the less well-known localities, nearly always writing up very interesting accounts of his ventures in the pages of the *Entomologists' Record* of which he was a Governor for several years till his death. His fine collection was meticulously set and arranged, as he always had an eye for the neat and beautiful.

We shall indeed miss the tall and imposing figure which used so often to grace our gatherings, for he had the interest and welfare of the Society so much at heart, and can be counted among its benefactors. Though by nature somewhat reserved, all who knew Oliver Howard found him most kindly and charming and always ready to impart his knowledge to those who came to seek it. They have lost a very good friend and his passing leaves a big gap in the ranks of field entomologists. Our wholehearted sympathy goes out to his widow and brothers in their great bereavement which has been shared alike by so many of us.

C. G. M. de W.

ABSTRACT OF PROCEEDINGS

INDOOR MEETINGS

9th FEBRUARY 1961.

The PRESIDENT in the Chair.

A welcome was extended to Professor Slater of the University of Columbia, U.S.A.

The following new members were declared elected: Brigadier H. L. Lewis, Messrs. R. G. Adams, C. G. Bruce, D. J. Clark, P. C. Jerrard, D. H. Harvey, J. Quinlan, M. Schaeffer, C. D. Speight.

EXHIBITS.

Mr. A. E. GARDNER—Two males of the beautiful Asian dragonfly *Pseudophaca splendens* (Selys) from Central Province, Ceylon, 20.iv.54.

COMMUNICATIONS.

The LIBRARIAN reported the following additions to the library: A *Provisional Check List of the Butterflies of the Ethiopian Region* by W. Peters, *Prodromus Lepidopterorum Britannicum* by A. H. Haworth (a facsimile copy), Supplements 1, 2 and 3 to the *Indexed Check List of British Lepidoptera* by I. R. P. Heslop, *A List of the Butterflies and Moths (Macrolepidoptera) occurring in the neighbourhood of Folkestone* by A. M. Morley, and *Victoria County History of Surrey, Section Zoology*, all presented by Mr. E. W. Classey; *Common Malayan Butterflies* by R. Morrell presented by Mr. M. W. F. Tweedie; *A Reclassification of the Order Odonata* by F. C. Fraser, *Faune de Madagascar, I Insectes, Odonates, Anisoptères* (in French) by F. C. Fraser and *The Odonata of Madagascar, Zygoptera* by E. Schmidt (translated from the German by F. C. Fraser), presented by Dr. F. C. Fraser; and *Atlante Entomologico (esclusi i Lepidotteri)* Presented by P. M. Polak.

Members commented on recent appearances of Lepidoptera at light which included *Alsophila aescularia* Schiff., *Phigalia pedaria* F., *Erannis leucophaearia* Schiff. and *Theria rupicaprararia* Schiff. (Geometridae) and *Tortricodes tortricella* Hüb. (Tortricidae).

Series of coloured transparencies were shown by Messrs. J. D. Bradley, R. F. Haynes and R. M. Mere.

23rd FEBRUARY 1961

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs. W. Dolling, R. Long and G. E. Nixon.

EXHIBITS.

The PRESIDENT—An example of the mirid bug *Zygimus nigriceps* (Fall.) taken by Mr. K. C. Side from scots pine at Glen More, Inv., 31.vii.60. This is only the third example recorded in the British Isles. The species was added to the British list by Mr. G. G. E. Scudder (1958, *Ent. mon. Mag.* **94**:171-2) who discovered two examples in the collection of Mr. J. J. F. X. King, in the department of Zoology, Glasgow University. The insects were mounted together and collected at Nethy Bridge, Inv., 10.vii.11.

Mr. A. E. GARDNER—Orthoptera from the Canary Islands collected by Mr. E. S. A. Baynes.

COMMUNICATIONS.

The LIBRARIAN reported that Dr. H. E. Hickin had presented reprints from *Timber Technology*, Nos. 1 to 6 dealing with unusual wood boring beetles; also a reprint of the paper "An introduction to the Study of the British Lyctidae". Mr. S. N. A. Jacobs had presented Fascicle 8, Tome 1, of *Alexanor, Revue des Lépidoptéristes français*.

Lepidoptera this season were reported to be two to three weeks ahead of normal. Recent warm days had brought *Gonepteryx rhamni* L. (Pieridae), and *Nymphalis io* L. and *Aglais urticae* L. (Nymphalidae) out of hibernation. *Leucochlaena hispida* Gey. (Noctuidae) had been seen and many species of *Orthosia* (Noctuidae) were out. *Achlya flavicornis* L. (Thyatiridae) which normally occurs about the middle of March was also reported.

Mr. R. F. HAYNES said that at Chiddingfold, Surrey, one willow was seen to be in full bloom.

The PRESIDENT was of the opinion that Hemiptera were also in advance of normal. *Lygus kalmii* (L.) (Miridae) was already out; it is a species which hibernates as an adult and is attracted to willow. It usually appears about the first week in March.

Two cinematograph films were introduced by Mr T. G. Howarth. One dealt with the life of Linnaeus, a Swedish film in sound and colour; and the other, entitled "Woodpeckers", was made by Heinz Sielmann.

8th MARCH 1961.

In the rooms of the Linnean Society, Burlington House.
The PRESIDENT in the Chair.

The death was announced of Sir Leonard Wakely, K.C.I.E., C.B.

A welcome was extended to Dr. Young, a distinguished coleopterist from Indiana, U.S.A.

Dr. D. Kyle was declared elected a member.

EXHIBITS.

Mr. B. GOATER—The moss *Aulacomnium androgynum* (Hedw.) Schwaegr., bearing gemmae; and the liverwort *Lophocolea heterophylla*

(Schröd.) Dunn., in several stages of development. The two plants were found living together on rotting wood in Scratch Wood, Middx.

COMMUNICATIONS.

The season in the south appeared to be still well in advance of normal. Many spring Lepidoptera were reported, but at Wood Walton Fen very few of the salallows showed any signs of blossoming.

Lepidopterous larvae, according to Mr. A. H. Sperring, were not early; and though *Leucania lythargyria* Esp. (Noctuidae) was out, *Diarsia brunnea* Schiff. (Noctuidae) had not yet been seen.

Mr. S. N. A. Jacobs said that under some grass in his garden the previous Sunday (4th March) he had found a number of dead larvae of *Hepialus lupulina* L. (Lep., Hepialidae). He counted 30 dead and only one alive; he suggested that this could be caused by an infection since the dead larvae were soft and flaccid.

The PRESIDENT said that fruit insects were about two weeks early in Kent; and an instance was cited where hibernating larvae had become active before the plant on which they were sleeved had come into leaf.

Mr. W. H. T. TAMS gave an interesting talk on the Linnean collections, which included a account of how they came into the possession of the Linnean Society. Drawers from the cabinets containing insects and other animals were laid out for members' examination.

23rd MARCH 1961.

The PRESIDENT in the Chair.

The President announced the election of our member Dr. H. E. Hinton to the Royal Society. He also extended a welcome to Dr. Woodward from Queensland University, Brisbane, and to Professor J. A. Slater of the U.S.A. who was paying the Society a second visit.

EXHIBITS.

The PRESIDENT—(1) Leaves of the evergreen shrub, *Viburnum tinus* L. on which were small scale insects killed by an entomophagus fungus of the genus *Empusa*. The white flocculent fructifications produced by the fungus were distinct to the naked eye. (2) The uncommon *Drymus pumilio* Puton (Hem., Lygaeidae) which is rarely represented in collections. It seems to be confined to the south and south-west of England, is a ground-loving species usually found on chalky soils, and occurs amongst low-growing plants where the vegetation is sparse. The bug occurs at Critel Down, Blandford, Hod Hill, Charmouth and Witchampton in Dorset, and at Pitt's Deep near Lymington, Hants.

Mr. DENNIS LESTON—Examples of the lygaeid (Hem.) genera *Oncopeltum* and *Blissus*.

Mr. S. WAKELY—An example of *Acrocercops imperialella* Mann (Lep., Gracillariidae) which he had taken as a larva at Wood Walton Fen, Hunts., 24.ix.60. The insect had been forced and the moth emerged on 16.ii.61. He also showed *A. ononidis* Zell. which it closely resembles

and he pointed out the differences. The larvae he said, had been found not uncommonly on *Symphytum* (Comfrey) at Wicken Fen, Cambs., by W. Farren in 1886; but there have been very few records since. A few have been taken in Dorset and in the New Forest, Hants., where the larvae feed in the leaves of *Pulmonaria* (Lung-wort), the last record being of one bred in 1940.

Mr. F. D. BUCK—Four species of Coleoptera taken in vegetable litter on the Copper field at Wood Walton Fen, Hunts., 6.iii.60: *Conosomus littoreus* (F.), *C. testaceus* (F.) and *Ochtheophilum fracticorne* (Payk.) (Staphylinidae) and *Ptenidium nitidum* (Heer) (Ptiliidae). According to our standard works on British Coleoptera, vegetable litter heaps are unusual places to take *Conosomus littoreus* (F.). Fowler (1888, *Col. Brit. Is.* 2: 191) says "In faggots, bottoms of woodstacks, under loose bark, in fungi, rotten wood, etc.;" whilst Joy (1932, *Brit. Beetles*, 1: 88) contents himself with "chiefly in faggot stacks". Reitter (1909, *Fauna Germanica* 2: 93) gives no habitat at all, and Donisthorpe (1939, *Col. Windsor Forest*, p. 36) agrees with Fowler and Joy, and states "under wood-stacks and logs". None of these habitats suggest the dampness of vegetable litter on the Copper field in March and November, though not all the habitats given by our three authorities are as dry as the only habitat common to all three—faggots. The only other time the exhibitor had seen this insect in the field was when Mr. W. H. Forster obtained an example at High Beech, Essex, at a sapping birch stump in April (Buck, 1955, *Ent. mon. Mag.*, 91: 181). This too was a dry situation apart from the dampness of the sap. The insect is not always easy to recognise in the field when it occurs in company with *C. testaceus* (F.) as it does here. The example taken in November was not recognised in the field but was bottled to ensure its congener was recorded. Mr. A. E. Gardner, who also works the area, subsequently found he had examples awaiting determination. On 6th March this year the beetle was searched for and several were found, most of which were not definitely recognised in the field. The coloration, i.e., the light markings on the elytra and on the basal angles of the pronotum are not always reliable; the absence of close pubescence, the more elongate elytra and more elongate antennal segments much more easily distinguish *C. littoreus* from *C. testaceus*.

Ochtheophilum fracticorne (Payk.) is another species which also occurs in Epping Forest. The species is in its natural habitat; it likes wet, boggy situations. The interesting association here lies in the fact that one of the spots in Epping Forest (Cuckoo Pits) where it was taken is the only spot outside fenland or broadland localities where the exhibitor has taken *Agonum thoreyi* Dej. (Carabidae) which occurs in the same situations as *O. fracticorne* in Wood Walton Fen and also in Wicken Fen, Cambs.

Mr. T. R. EAGLES—(1) Dead stems of *Pteridium aquilinum* (L.) Kuhn (Bracken) with the short black lines caused by the Fungus *Rhopographus filicinus* (Fries.) Nitschke apud Fuckel. (2) The moss *Orthodontium lineare* Schwaegr. Fifty years ago it was unknown in

the British Isles. It was first observed in 1920 in Yorkshire, since when it has spread rapidly. In 1946 Mr. J. H. G. Peterken found it in Epping Forest, Essex, and it is now found in most of the woods around London. Both exhibits were from Epping Forest.

COMMUNICATIONS.

The season was still quite early, blackthorn was now in bloom and the swallow was nearly over. The butterflies *Pieris rapae* L. and *P. napi* L. (Pieridae), *Pararge aegeria* L. (Satyridae) and *Celastrina argiolus* L. (Lycaenidae) had been seen on the wing; and the moths *Gypsotea leucographa* Schiff. (Noctuidae) and *Trichopteryx polycommata* Schiff. (Geometridae) were also reported.

The PRESIDENT opened a symposium on "Recent developments in the study of the Lygaeidae (Hemiptera)" in which the principal speakers were Mr. DENNIS LESTON, Professor J. A. SLATER and Dr. T. R. E. SOUTHWOOD. The symposium covered such aspects as morphology, biology and the structure of the ova. It was shown that systematics in the Lygaeidae had reached an important and interesting stage.

13th APRIL 1961.

The PRESIDENT in the Chair.

The following new members were declared elected: Dr. K. J. Fox and Mr. A. Gould.

EXHIBITS.

The PRESIDENT—The very local weevil *Cathormiocerus myrmecophilus* Seid. (Col., Curculionidae) from Fairflight Glen, East Sussex, 30.iii.61. The insect occurs in grass tufts at the side of a track leading to the cliffs. The late Mr. W. H. Bennett, a local coleopterist, found this weevil in the same locality at the beginning of this century.

Mr. A. E. GARDNER—Two rare staphylinid beetles, *Geodromicus globulicollis* (Mannerh.) and *Oxyptoda tirolensis* Gred. taken from the top of the Cairngorms, Inverness-shire, 9.vii.60. The exhibitor expressed his thanks to Mr. H. R. Last who determined the species.

Mr. T. R. EAGLES—(1) Seeds of *Lithospermum officinale* L. (Gromwell) from Druids Grove, Surrey. The white seeds remain on the plant all winter after the leaves have fallen (2) Catkin-bearing spray from a monœcious form of *Salix atrocinerea* Brot. (Common Sallow) from Ranmore, Surrey.

Mr. T. G. HOWARTH—Two fully-grown larvae of *Favonius yuasai* Shirôzu (Lep., Lycaenidae), a Japanese Hairstreak which has the male a dull brown instead of the usual brilliant green.

COMMUNICATIONS.

Pieris rapae L. (Lep., Pieridae) was reported to have been seen on the 24th March and again on the same day as the meeting.

The PRESIDENT said that in the past few days he had seen *Eurydema dominulus* (Scop.) (Hem., Pentatomidae), a species confined to Kent and East Sussex and not normally out as early as this. The bug is associated with *Cardamine pratensis* L. (Cuckoo Flower).

Odontosia carmelita Esp. (Lep., Notodontidae) was reported, by Mr. J. O. T. HOWARD, to have been seen on 1st April.

A talk was given by Mr. R. G. DYSON on "Interesting plants for the entomologist's garden" which he illustrated with some excellent coloured transparencies.

27th April 1961.

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs. H. B. Ellerton, W. H. H. Morris, A. J. W. Owston, E. A. Sadler and R. G. Thimann.

EXHIBITS.

The PRESIDENT—*Lasioryhynchites ophthalmicus* (Steph.) (Col., Curculionidae) from Chattenden Roughs, Kent, where it is associated with hazel and birch, and occasionally with scrub oak. The beetle occurs in April and May, and can also be found in Kent at Darenth Wood, but it is a very local species.

Mr. F. D. BUCK—Five species of Hydradeephaga (Col., Dytiscidae): *Dytiscus circumflexus* F., *D. circumcinctus* Ahrens, *D. semisulcatus* Muell., *Hydaticus transversalis* (Pont.) and *H. seminiger* Deg. All from Wood Walton Fen, Hunts., 15.iv.61. Taken in conjunction with Mr. Gardner's exhibit following, this shows all the British members of the genus *Dytiscus* to have been present in the Fen over a seven-day period, with the exception of *D. lapponicus* Gyll. Also the two *Hydaticus* spp. are our only representatives in that genus. All these species have been previously taken in the Fen with the exception of *D. circumflexus* F.

Mr. A. E. GARDNER—Set examples of two water beetles (Col., Dytiscidae): *Dytiscus dimidiatus* Bergstr., from Wood Walton Fen, Hunts., 10.iv.61, and *Cybister lateralimarginalis* Deg., from Fooshan, Manchuria. The latter species having been found in England (in Essex and Middlesex) on only three or four occasions from 1826 to 1831. Also shown were living examples of the following Coleoptera (Dytiscidae): *Dytiscus marginalis* L., females; *D. dimidiatus* Bergstr., male; *D. circumcinctus* Ahrens, male and female; *D. circumflexus* F., female; a mature larva of a *Dytiscus* sp.; *Hydaticus transversalis* (Pont.); and *Agabus undulatus* (Schrank). All being taken during a few hours at Wood Walton Fen, Hunts., 26.iv.61.

Mr. M. G. MORRIS—(1) Weevils (Col., Curculionidae) collected from January to mid-March 1961, chiefly to show a few of the species which can be obtained by winter work. By beating the bare branches of hawthorn: *Anthonomus cherrolati* Desbr. (at first thought to be *A. rosinae*

Des G., and exhibited as such 1961, *Proc. S. Lond. ent. nat. Hist., Soc.* 1960: 59), East Malling, Kent, 6.i.61. By sifting moss collected on chalk downs: *Trachyploeus scabriculus* (L.) and *T. olivieri* Bed., Boxley, Kent, 12.ii.61; *Orthochaetes insignis* (Aubé), Detling, Kent, 6.ii.61 and *O. setiger* (Beck), Boxley, 12.ii.61. By sifting moss collected in woods: *Caenopsis waltoni* (Boh.), East Malling, 5.iii.61; *Barynotus moerens* (F.), Ashow, near Kenilworth, Warwicks., 20.ii.61. By cutting and shaking clumps of rushes (*Juncus*): *Notaris scirpi* (F.) and *Epipolaeus caliginosus* (F.) (an unusual situation), East Malling, 20.iii.61. At the roots of grasses and low plants: *Smicronyx reichi* (Gyll.), Aylesford, Kent, 22.i.61. By sweeping *Cardamine amara* L.: *Ceuthorhynchus suturellus* Gyll., Blean, Kent, 17.iii.61. (2) A preserved larva and pupa of *Anthonomus chevroleti* Desbr., East Malling, 14.iv.61. (3) The larval gall made by *Anthonomus chevroleti* Desbr. in trusses of hawthorn leaves at East Malling, 27.iv.61.

Mr. H. N. E. ALSTON—Galls of the mite *Phytoptus tiliae* (Pagst.) (Acarina) on lime leaves found in Cambridgeshire, 23.iv.61. It usually occurs at least a month later than this.

Mr. S. WAKELY—Larva of *Pachythelia villosella* Ochs. (Lep., Psychidae) from the New Forest, Hants; and three species of lepidopterous larvae beaten from birch at the Chilworth, Surrey, field meeting, 23.iv.61: *Achlya flavicornis* L. (Thyatiridae), *Oporinia autumnata* Borkh. (Geometridae) and *Coleophora ibipennella* Zell. (*betulella* auct. nec. Hein. & Wocke) (Coleophoridae).

Mr. T. R. EAGLES—Flowers of *Cytisus adami* Poit., a chimaera or graft hybrid, from Enfield, Middx. The tree bears three kinds of flowers (1) *Laburnum anagyroides* Medic. (ordinary laburnum), (2) *Cytisus purpureus* Scop. (Purple Broom) and (3) flowers of the laburnum type but in smaller trusses, and pink. He read a note and referred to Mr. Dyson's recent talk to the Society and to the account published by the Society (1942, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1941-42: 69-71).

COMMUNICATIONS.

The HON. LIBRARIAN reported that Mr. H. G. Tunstall had presented the following books to the library: (1) *British Plant Life* by W. B. Turrill (No. 10 of the New Naturalist Series). (2) *The Natural History of Aquatic Insects* by Prof. L. C. Miall. (3) *The Butterflies of the British Isles* by Richard South (Wayside and Woodland series).

A brief discussion took place on the biology of *Smicronyx reichi* (Gyll.) and *S. jungermanniae* (Reich) (Col., Curculionidae).

Mr. J. O. T. HOWARD reported a bat in flight in full sunshine at 3.30 p.m. in N. Wales shortly before Easter this year.

Mr. A. H. SPERRING gave the following account of two much-travelled jackdaws, received from his daughter who was on board the s.s. "British Patrol" which at the time was near Socotra in the Indian Ocean. She reported that in March 1959 a message came from an ore carrier in neighbouring waters enquiring whether anything had been seen of her jackdaws which had been with the ore carrier since the Malta Channel and had travelled with that vessel up to Kuwait and

back down the Arabian coast. A few hours later, two jackdaws did arrive on the "British Patrol" and stayed with the vessel right down the African coast and into the South Atlantic until well to the east of Tristan da Cunha when they were both lost, apparently as a result of an autumn gale. They had been fed while on board and roosted at night in one of the after lifeboats. It seemed fairly certain that had they not been badly buffeted by the gale and so weakened and lost, they would have survived to reach land at Buenos Aires, the vessel's immediate destination.

Reports were given by Mr. S. WAKELY on the field meetings at Newlands Corner, Surrey and Chilworth, Surrey.

11th MAY 1961

The PRESIDENT in the Chair.

Mr. L. G. Stimson was declared elected a member.

EXHIBITS.

The PRESIDENT—The bug *Aradus aterrimus* Fieber (Hem., Aradidae) first recorded in England at Darenth Wood, Kent, in May 1861. A second example without locality is contained in the Scott collection; and further specimens were recorded from East Malling, Kent, in 1933 and 1934. This spring the bug was again found in Oaken Wood at East Malling in wood chips left by wood-cutters when the chestnuts were cut down in the winter of 1959-60. The bug is confined to Kent, and has been found sparingly in five localities only.

Dr. B. J. MACNULTY—Several species of Coccinellidae (Col.): *Anisosticta novemdecimpunctata* (L.), from Hickling Broad, Norfolk, September 1960; *Adonia variegata* (Goeze) and *Coccinella undecimpunctata* (L.) from Tuddenham, Suffolk, July 1960; *Subcoccinella vigintiquattuorpunktata* (L.), from Mucking Creek, Essex and Wood Walton, Hunts; *Micraspis sexdecimpunctata* (L.) from Tuddenham.

Mr. G. M. KINGSBURY—A larva of *Habrophlebia fusca* (Curtis) (Ephem., Leptophlebiidae) from the river Brett, Suffolk, 25.iv.61. The only previous records in southern England are one each from Cambridgeshire and Hampshire. The water was about a foot deep with a medium rate of flow, the vegetation slight and the river unpolluted, but rather filled with rubbish. The exhibit was found on the underside of a brick.

Mr. A. E. GARDNER—The following species of Coleoptera: (1) *Grammoptera ruficornis* (F.) ab. *holomelina* Pool (Cerambycidae) and *Osphyra bipunctata* (F.) (Melandryidae) from Monks Wood, Hunts, 30.iv.61. (2) A series of *Hydrobius niger* Zschach (Hydrophilidae) from Wood Walton Fen, Hunts., 3 and 16.iv.61.

Mr. S. N. A. JACOBS—Larvae of *Ypsolophus nemorellus* L. (Lep., Plutellidae) from Westerham, Kent.

Mr. T. R. EAGLES—A branch of *Forsythia intermedia* Zabel with terminal fasciation from Enfield, Middx. He referred to the two works

published by the Ray Society, Masters, M. T., 1869, *Vegetable Teratology*, and Worsdell, W. C., 1915-16, *The Principles of Plant Teratology*. There has been much dispute about the mechanism of fasciation, and doubtless this differs from case to case. He thought that in the present instance the following extract from page 81 of volume 1 of the second work would apply—"At the base and for a varying distance upwards, it has the usual cylindric contour; sooner or later, however, this becomes more and more flattened, until, in the upper part of the axis, a band-shaped structure is assumed which is due to the great increase in diameter of the stem in one place only . . .".

COMMUNICATIONS.

Dr. C. G. M. DE WORMS said that despite the warm weather few insects had come to his mercury vapour trap. The most interesting capture was a gynandromorphous example of *Cynia mendica* Clerck (Lep., Arctiidae). Major F. L. JOHNSON referred to a recent issue of the journal of the Lepidopterist's Society (formerly the *Lepidopterist's News*) in which was an account of the capture of siamese twins of *Parthenos salentis* Hopffer (Lep., Nymphalidae) in the Philippine Islands. The insect had two normal bodies with the usual number of legs and antennae, and which were joined at the thorax. Each body, however, had only one forewing and one hindwing.

Field meeting reports were given by Mr. S. Wakely for Otford, and Dr. A. M. Masee for Deal and Sandwich.

25th MAY 1961.

The PRESIDENT in the Chair.

The following new members were declared elected: Messrs. B. M. Greenwood, R. F. Major and A. Price.

EXHIBITS.

The PRESIDENT—Six examples of *Anthonomus cinctus* Koll. (Col., Curculionidae) bred from the buds of Cox's Orange Pippin apple at Keston, Kent, 11.v.61. This weevil was added to the British List in 1921 on specimens from Darenth, Kent; it has since been recorded from Wisbech, Cambs., Ashted, Surrey, and East Malling and Wilmington, Kent. It is never very common, but seems to survive in orchards where even organo phosphorus chemicals are in use.

Mr. F. D. BUCK—Three species of Tenebrionidae (Col.). (1) *Hegeter subrotundatus* Woll. from Grand Canary, 29.ii.60. This insect is represented in the collections in the British Museum (Nat. Hist.) by the type only which is in the Wollaston collection, two of the exhibited series of five will be deposited in the general collection of the British Museum. (2) *Anthracias curvicornis* Chev., males, from Gan, Maldive Islands, January 1961. This is an interesting genus in which the males have a pair of long curved horns on the head. It is closely allied to

Toxicum from which it differs in having the horns glabrous at the tips and the eyes completely divided, whilst in *Toxicum* the horns are pubescent at the tips and the eyes are incompletely divided. Both these genera are reasonably closely allied to our *Tenebrio*, but the phenomenon of the completely divided eye is very similar indeed to, though not so marked as in, our *Gyrinus*. The distribution of the two genera *Anthracias* and *Toxicum* is interesting too, inasmuch as *Anthracias* is Afro-Indian (including Ceylon), though it has a representative in southern Russia; whilst *Toxicum* is mainly Australian, from the islands to the north and north-west, and from south-east Asia. However, these two genera do come together in Japan and New Guinea. One exception to the overall pattern of distribution is *Toxicum cribrarium* Blanch. which occurs in Chile—it is very doubtfully a genuine *Toxicum* but as there is no material in the British Museum it is not possible to investigate it. (3) *Tribolium castaneum* (Herbst.) also from Gan, Maldive Islands. These arrived alive amongst a collection of dead insects consigned to Mr. A. E. Gardner under circumstances which led him to believe they may have been feeding on the dead insects. *T. castaneum* is at times a major pest in stored grain and similar foodstuffs, and will sometimes feed on fungus, but it is doubtful if it will feed on dead insects. The species is cosmopolitan and in its normal pabulum would be as likely to occur in the Maldives as elsewhere. The beetle is not exceptionally hardy and is unlikely to recover after being "killed" by anyone experienced in killing and despatching insects, as in this case; but since the material was despatched by airmail, and the chances of infestation in transit are considerably reduced, it is difficult to account for this occurrence in any other way.

Mr. A. E. GARDNER—The following species of Coleoptera: *Oreodytes halensis* (F.) (Dytiscidae) from Wood Walton Fen, Hunts., 3.v.61; living examples of *Chrysolina menthastri* (Suff.) (Chrysomelidae) from Virginia Water, Surrey, 20.v.61; and a teratological example of *Carabus violaceus* L. ab. *sollicitans* Hartert (Carabidae) from Dalwhinnie, Inv., 2.viii.60 taken by Mr. B. F. Skinner. The left antenna of this beetle having five segments arising from the base of the sixth and at right angles to it.

Mr. S. WAKELY—A larva and two pupae of *Hemistola immaculata* Thunb. (Lep., Geometridae) taken on the Otford field meeting, 30.iv.61; and a female *Fumaria casta* Pall. (Lep., Psychidae).

Mr. J. O. T. HOWARD—(1) Larvae of three moths, *Gypsites leucographa* Schiff. and *Jodia croceago* Schiff. (Noctuidae) from near Friday Street, Surrey, and *Polyphoca ridens* F. (Thyatiridae) from Dorking, Surrey. (2) Three specimens of the melanic aberration *monacharia* Staud. of *Phigalia pilosaria* Schiff. (*pedaria* F.) (Geometridae) and a bred series of *Bupalus piniaria* L. ab. *funebis* Cockayne (Geometridae) from Dorking showing a strong tendency, particularly in the females, to suppression of white markings on the underside of the hindwings, with the exception of the central white streak, and a general darkening of colour.

Mr. A. PRICE—A series of *Dytiscus circumcinctus* Ahrens (Col., Dytiscidae) showing: the male, the smooth female, and the sulcate female, all taken in the Reading district of Berkshire where the sulcate female seems to be commoner than the smooth. He also showed a pair of living examples, and for comparison set specimens of *D. marginalis* L. and *D. circumflexus* L.

Mr. E. S. BRADFORD—A series of *Tinea granella* L. (Lep., Tineidae) bred from dried Italian mushrooms.

COMMUNICATIONS.

The LIBRARIAN reported the following additions to the library: No. 48 of *Die Tierwelt Deutschlands, Tortricidae*, by Dr. Hans Joachim Hannemann; *Les Insectes*, Vol. II, Hyménoptères, Lépidoptères, Rhynchotes, Diptères, by Paul A. Robert; Fascicle 1 of Tome II of *Alexanor*, presented by Mr. S. N. A. Jacobs; *An Illustrated List of the British Tortricidae*, Part II, by J. D. Bradley; *Lepidoptera of Haslemere and District*, Science Paper No. 5, Haslemere Natural History Society, presented by Mr. R. M. Mere; *British Cup Fungi and their Allies* by R. W. G. Dennis, presented by Dr. A. M. Massee; *The Coleoptera of the Isle of Man*, by H. Britten, presented by Mr. J. L. Henderson; and *Hong Kong Butterflies*, by Major J. C. S. Marsh, presented by Mr. M. W. F. Tweedie.

Referring to Mr. Buck's exhibit, Mr. S. N. A. JACOBS said that it was his experience during the time he was engaged on food infestation work that *Tribolium castaneum* (Herbst) would eat almost anything, and that he would not be surprised to find the species eating dried entomological specimens.

Dr. C. G. M. DE WORMS said he had recently been to Sauley Forest, Northants., and the blackthorn had been drastically cut back. He added that Captain Jackson, who visited the area frequently had found only a single *Strymonidia pruni* L. (Lep., Lycaenidae) during the whole season. Continuing to comment on Lepidoptera he said that *Euphydryas aurinia* Rott. (Nymphalidae), *Hamearis lucina* L. (Nemeobiidae) and *Strymonidia w-album* Knoch (Lycaenidae) were out. In Shropshire, *Hadena bombycina* Hufn. and *Apatele menganthidis* View. (Noctuidae) were on the wing. There was, however, little at light.

Contrary to recent opinion that the season was early, Dr. B. J. MACNULTY had recently been taking *Orthosia incerta* Hufn. and *O. gothica* L. (Noctuidae) in perfect condition.

In the experience of Mr. R. S. TUBBS butterflies were scarce. During a day's collecting at Chiddingfold he had seen only three *Leptidea sinapis* L. (Pieridae) and one *Clossiana euphrosyne* L. (Nymphalidae), though a number of *Gonepteryx rhamni* L. (Pieridae) were out and, he added, it was the same in West Sussex. Another member said he had found *Clossiana euphrosyne* L. plentiful at Ham Street, Kent, and *Clossiana selene* Schiff. (Nymphalidae) was just coming out.

Mr. S. WAKELY said he had taken *Euphyia luctuata* Schiff. (Lep., Geometridae) at Westwell, Kent, 21.v.61.

Field meeting reports were given by Mr. B. Goater for Whippendell Wood and by Mr. S. Wakely for Challock.

8th JUNE 1961.

The PRESIDENT in the Chair.

Dr. H. M. Chappel was declared elected a member.

EXHIBITS.

The PRESIDENT—*Liparus germanus* (L.) (Col., Curculionidae), a local and uncommon weevil found mainly in Kent. The adult feeds on the leaves, and the larva on the roots, of *Heracleum sphondylium* L. (Hogweed), and the insect occurs as an adult in April, May and June.

Mr. A. PRICE—(1) Two females and a male *Ilybius guttiger* (Gyll.) (Col., Dytiscidae), taken at the margins of a *Carex* swamp in Queens Mere, Berks., 4.vi.61; the mere is being fenced in as a bird sanctuary. Also 12 examples of *Agabus affinis* (Payk.) (Col., Dytiscidae). (2) A female *Ilybius aenescens* Thoms. which is normally extremely abundant in Kings Mere, Berks., for a short period, after which it is harder to find. The exhibit was taken 4.vi.61. (3) Two examples of *Gyrinus urinator* Ill. (Col., Gyrinidae) taken in the river Gwendraeth, Kidwelly, Carmarthenshire, 28.viii.58, where they are not abundant.

Mr. A. E. GARDNER—Examples of *Pterostichus lepidus* (Leske) (Col., Carabidae) from Woolmer, Hants., 6.vi.61.

Mr. A. A. MYERS—A bred gynandromorph example of *Laothoe populi* L. (Lep., Sphingidae) *ex ova* from a Kingsbury, London, N.W.9, female; left side male, right side female.

Mr. T. R. EAGLES—Plants found at Wood Walton Fen, Hunts., on the field meeting, 4.vi.61; *Viola stagnina* Kit. (Fen Violet) and *Thalictrum flavum* L. (Common Meadow Rue).

Mr. R. M. MERE—(1) *Cyenia mendica* Clerck (Lep., Arctiidae) males from the Burren, Co. Clare, Ireland, showing variation in colour and spot marks, with English males for comparison. (2) *Spilosoma lubricipeda* L. (Lep., Arctiidae) from western Ireland, with buff forewings.

COMMUNICATIONS.

The LIBRARIAN reported the following additions to the library: (1) *The Nigerian Butterflies* by John Boorman and Patrick Roche, Part I: Papilionidae and Part V: Nymphalidae (Section 3). Presented by Mr. S. N. A. Jacobs. (2) *Outlines of Entomology* by A. D. Imms, fifth edition revised by O. W. Richards and R. G. Davies. Presented by Mr. F. T. Vallins. (3) *A List of Irish Butterflies* by E. S. A. Baynes, and a separate from the *Irish Naturalists' Journal*, "Report on Migrant Insects in Ireland for 1960" by E. S. A. Baynes. Both presented by the author. (4) A separate from the *Journal of the Lepidopterists' Society*, "The preservation of lepidopterous larvae using the inflation and heat-drying technique" by H. E. Hammond. Presented by the author.

Mr. R. M. MERE referred to the Lepidoptera noted on his recent visit to Ireland, which consisted of ten days in the Burren area of Co. Clare, and four days in the vicinity of Killarney. The weather was sunny with very cold nights, and the wind predominantly in the east to north-east quarter. On 15th-16th May on the Burren coast he had taken *Hadena caesia* Schiff. (Noctuidae), whilst in most parts of the area *Orthosia gothica* L. and *O. incerta* Hufn. (Noctuidae) were in fair condition. At mercury vapour light *Leucania vitellina* Hüb. and *L. unipuncta* Haw. (Noctuidae) were taken, the former in the Burren and the latter at Kenmare. *Leptidea sinapis* L. (Pieridae) was common in the Burren and the noctuids *Apatele alni*, *A. menyanthidis* View. and *Hadena bombycina* Hufn. were also present. Many interesting micros were taken, most of them being as yet undetermined, but *Hypercallia christiannana* L. (Oecophoridae) larvae, and some pupae, were found in a very restricted area on *Polygala* (Milkwort). Though *Polygala* was searched in other places the insect occurred in the one spot only. Other micros taken included: *Glyphipterix schoenicolella* Staint. (Glyphipterigidae), *Alucita tetradactyla* L. and *A. icterodactyla* Mann. (Pterophoridae). At Killarney, *Stauropus fagi* L. (Notodontidae) and *Apatele alni* L. (Noctuidae) were both taken at night, but though search was made for *Leucodonta bicoloria* Schiff. (Notodontidae) none were found.

Dr. C. G. M. de Worms reported taking a remarkable black *Drymonia dodonaea* Schiff. (Lep., Notodontidae).

At Wood Walton Fen, Hunts., *Arenostola extrema* Hüb. and *Leucania obsoleta* Hüb. (Lep., Noctuidae) were reported to be well out but there was little else of interest.

A discussion took place on mite larvae on *Dytiscus* spp. (Col.) and other aquatic insects.

Field meeting reports were given for Effingham by Mr. T. R. Eagles and Wood Walton Fen by Mr. A. E. Gardner.

Mr. S. BEAUFOY gave a talk on "Insect Photography" illustrated by the lantern and followed by an interesting discussion.

22nd JUNE 1961.

The PRESIDENT in the Chair.

Mr. C. J. Goodall was declared elected a member.

EXHIBITS.

The PRESIDENT—A rare and very local mirid bug, *Pachytomella parallela* (Meyer-Duer), recently added to the Kent list, and which occurs amongst the roots of fine grass at Lunsford, East Malling, Kent. It has been recorded from Essex, Surrey, Dorset, Devon, Gloucestershire and Scotland. It is said to occur in July and August, but the Kent specimens have been obtained in May and June, so it seems likely that there may be two generations each year.

Mr. A. E. GARDNER—*Laphria flava* (L.) (Dipt., Asilidae), a robber fly taken in the Cairngorms Nature Reserve, 5.viii.60.

Mr. T. R. EAGLES—Racemes of seed pods of *Laburnum alpinum* (Mill.) Berchtold & Presl. (Scotch Laburnum) and of *Laburnum anagyroides* Medic. (Common Laburnum). The pods of the former are glabrous and shining green whereas those of the latter are downy and duller green. Moreover, the former has a thin edge to the seam at the top of the pod while the latter has a thicker edge. (See Harrison, S. G., 1960, *Garden Shrubs and Trees*, The Kew Series, p. 113).

Mr. A. PRICE—Water beetles taken in the river Pang at Hampstead Norris, Berks. (1) A series of *Agabus biguttatus* (Ol.) (Hydradephaga) including a red female; one example taken 11.vi.61 and the rest 17.vi.61. The beetles were very abundant in the part of the river which was a trickling stream over gravel. They extended for half a mile down stream, becoming less abundant as the water got deeper. (2) Seven examples of *Hydroporus marginatus* (Dufts.) (Hydradephaga), 17.vi.61, which was not so plentiful as the *Agabus* but occurred in much the same place. (3) *Helophorus* spp. (Hydrophilidae) which were extremely abundant in the river in the shallower, swift flowing reaches.

Mr. R. W. J. UFFEN—A specimen of *Oidaematophorus lienigianus* Zell. (Lep., Pterophoridae) from Chiswick, Middx., 17.vi.61.

COMMUNICATIONS.

Mr. A. PRICE said he had recently made several attempts to breed *Dytiscus* water beetles and had lost all his material, usually at the pupal stage when they had developed mould or turned black and died. Very little constructive advice could be given though several suggestions were made.

The PRESIDENT said that on a recent visit to Dungeness, Kent, he was distressed to find that in widening the road to the new power station the shingle had been bulldozed for ballast in spite of promises to leave this intact. All the scrub had been destroyed. Dr. Massee is making enquiries but fears that this part of the locality is now lost.

Field meeting reports were given for Princes Risborough and Groombridge.

13th JULY 1961.

The PRESIDENT in the Chair.

Mr. R. W. J. Read was declared elected a member.

EXHIBITS.

The PRESIDENT—The rare and very local mirid bug *Trigonotylus psammaecolor* Reuter which occurred in numbers on *Agropyron junceiforme* A. & D. Löve (Sand Couch Grass) growing on Sandwich dunes, Kent. The adult bug is found in June and has a very limited adult life. Much confusion has arisen in the past because the bug was

thought to be associated with *Ammophila arenaria* (L.) Link. (Marram Grass). In this country it does in fact occur on *Agropyron junceiforme*, and over 30 specimens have been bred on this grass from the first and second instars. The insect also occurs at West Wittering, Sussex, and also in Cambridgeshire, Lancashire, Hants, Lincolnshire, Glamorgan-shire, and Carmarthenshire.

Mr. A. PRICE—(1) Water beetles from Benfleet, Essex, 1.vii.61: *Haliphus apicalis* Thom. (Halipidae) and *Hygrotus* (*Coelambus*) *parallelogrammus* (Ahrens) and *Agabus conspersus* (Marsh.) (Dytiscidae). (2) Three living examples of *Triturus helveticus* Razoumowski (*palmatus* Schneider) (Palmate Newt), from an acid pond on Wokefield Common, Berks., 9.vii.61. One example was normal while the other two appeared to be neotenic, i.e., they retain larval characteristics. It was subsequently discovered that they were in fact not neotenic. More than 50 of these pseudo-neotenic examples were found in the pond which was rapidly drying up. No Smooth Newts were found and only one Great Crested Newt, which was normal. The water in the pond was very low, was brown and acid, and as a result of the pond drying up the animal life was very crowded.

Mr. B. F. SKINNER—Larvae of *Hemaris tityus* L. (Lep., Sphingidae) found on *Succisa pratensis* Moench. (Devil's-bit Scabious) at Welsford Moor, Bideford, N. Devon.

Mr. A. E. GARDNER—(1) *Cantharis abdominalis* F. ab. *cyanea* (Curt.) (Col., Cantharidae) taken at Alston, Cumberland, by Mr. W. F. Davidson, 31.v.61. (2) A series of the water beetle *Platambus maculatus* (L.) (Dytiscidae) from the Oberwater, New Forest, Hants; Aviemore, Inv.; and Ullswater, Cumb.; showing the variation of colour. Also a series of *Deronectes elegans* (Panz.) (Col., Dytiscidae) from the Oberwater, 9.vii.61.

Mr. C. N. HAWKINS—A living example of *Volucella zonaria* (Poda) (Dipt., Syrphidae) taken at Wimbledon, Surrey, 13.vii.61.

COMMUNICATIONS.

The Hon. LIBRARIAN reported that Mr. F. T. Vallins had presented 39 books to the library. With two exceptions, these relate to evolution and constitute an up-to-date and comprehensive library on the subject in themselves. Mr. S. N. A. Jacobs had presented Fascicle 2 of Tome II of *Alexanor*, and *A List of Butterflies and Moths (macrolepidoptera) occurring in the neighbourhood of Ashford, Kent*, had been obtained.

In answer to a question, Dr. A. M. MASSEE said that the locality for *Trigonotylus psammacolor* Reuter was new and that he suspected that the species produced two generations a year.

Specimens of *Volucella zonaria* (Poda) it was pointed out were usually male when taken in the latter part of the year, while the female occurred earlier.

Dr. H. E. HINTON, F.R.S., read a paper "The taxonomic significance of the structure of insect egg shells", which he illustrated by the lantern. The paper was followed by an interesting period of questions and dis-

cussion which covered such aspects as the relationships of the structure of the egg with the structure of the female; the structure of the chorion compared with the oviposition site; terrestrial eggs compared with eggs that are entirely submerged; and the use of the horns in the eggs of *Nepidae* (Hem.).

27th JULY 1961.

Mr. R. M. MERE, F.R.E.S., Vice-President, in the Chair.

Mr. D. R. M. Long, LL.B., was declared elected a member.

EXHIBITS.

Mr. R. M. MERE—Three *Zelleria saxifragae* Staint. (Lep., Hyponomeutidae) bred from larvae found in May, in South Kerry, Ireland, mining the leaves of *Saxifraga hirsuta* L., *S. spathularis* Brot., and a cross between the two. He showed coloured transparencies of the insect's habitat, mines, etc., photographed by Mr. J. D. Bradley. The larva which was very local, though plentiful when found, was discovered in this locality by Mr. E. C. Pelham-Clinton.

Mr S. N. A. JACOBS—Leaves of *Carlina vulgaris* L. (Carlina Thistle) with the feeding webs of the larva of *Choreutis bjerkanrella* Thunb. (Lep., Choreutidae). He pointed out that the feeding web was spun from side to side on the leaf making a tube over the midrib, and that the pupating tube was spun across the two opposite lobes of the leaf. He added that the moth, a mountain species from Saas Fee, Valais, Switzerland, was added to the British list about 20 years ago and is recorded in Great Britain, in the south, from Kent to Cornwall.

Mr. R. W. J. UFFEN—(1) Larvae of *Coleophora lineolea* Haw. (*crocogramma* Zell.) (Lep., Coleophoridae) from Chiswick, Middx., in their first instar mines and cases. He remarked that some bored through the base of their eggs straight into the leaf, filling the shell with frass, whilst others left through the side of the egg and made their first mines some distance away. (2) A female example of *Coleophora clypeiferella* Hof. from Chiswick, 25.vii.60.

Mr. J. A. C. GREENWOOD—Almost full-grown larvae of *Selenia lunaria* Schiff. (Lep., Geometridae) from ova laid by a female taken at mercury vapour light at Woking, Surrey, 3.vi.61; the young larvae hatched 17.vii.61.

Mr T. R. EAGLES—Flowering plants gathered on the Hothfield field meeting, 23.vii.61, including *Scutellaria minor* L. (Lesser Skull-cap) and *Narthecium ossifragum* (L.) Huds. (Bog Asphodel).

COMMUNICATIONS.

Mr. R. M. MERE said he had taken a female *Celerio galii* Schiff. (Lep., Sphingidae) in his mercury vapour trap at Chiddingfold, Surrey, a week earlier. Another member reported that Mr. R. F. Bretherton also had a female *C. galii* Schiff. in his trap on the 25th.

Mr. S. N. A. JACOBS queried the name *lineolea* for the *Colcophora* spp. exhibited by Mr. Uffen. Mr. UFFEN said he had followed Toll (1952, Eupistidae of Poland, *Documenta Physiographica Poloniae*, Krakow) who gave with it the synonym *crocogramma* Zeller*. In reply to Mr. Jacobs who then asked what was the species that occurred on *Stellaria graminea* L. (Lesser Stitchwort) Mr. Uffen said *C. striatipennella* Nylander and Tengst.

10th AUGUST 1961.

The PRESIDENT in the Chair.

EXHIBITS.

The PRESIDENT—A series of the beetle *Ips cembrae* Heer (Scolytidae) together with larval galleries in *Larix* spp., from Grantown-on-Spey, Morayshire, 4.viii.61. He said that this species was first recorded in Gt. Britain in 1955, from the north of Scotland, by Crooke and Bevan (1957, *Forestry* 30: 21-28). It is associated with larch and may prove very destructive, killing established trees up to 45 years of age. Numerous specimens were found in felled larch logs. This species is readily separated from other members of the genus, and the galleries made by the larvae are also typical.

Mr. A. E. GARDNER—Specimens of the following local and rare Coleoptera taken in Aviemore, Inv., 27.vii. to 4.viii.61: *Carabus glabratus* Payk. v. *lapponicus* Born. (Carabidae), *Trichius fasciatus* (L.) (Scarabaeidae), *Pogonocherus fasciculatus* (Deg.), *Strangalia quadrifasciata* (L.) and *Arhopalus rusticus* (L.) (Cerambycidae), and *Thanasimus rufipes* (Brahm) and *T. formicarius* (L.) (Cleridae).

Dr. C. G. M. DE WORMS—Young larvae of *Zyggaena loti* Schiff. (*achilleae* Esp.) (Lep., Zygaenidae) bred from imagines from the Isle of Mull, June 1961.

Mr. M. G. MORRIS—The following Coleoptera taken at Dungeness, Kent, 28.iv.61: *Dryophilus anobioides* Chev. (Anobiidae) which was not uncommon in dead broom. He said that Dr. Hickin (1959, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1958: 56) states that this species is "very rare". *Laemophloeus sparti* (Curt.) (Cucujidae) which also occurred in dead broom. The larva is said to feed on scolytid larvae in their galleries. *Ceuthorhynchus posthumus* Germ. (Curculionidae), a local species associated with *Teesdalia nudicaulis* (L.) R.Br., and which was found plentifully on that plant and occasionally by general sweeping. *Phloeophthorus rhododactylus* (Marsh.), a scolytid which occurs on

*Mr. Uffen has since checked the literature and finds that Haworth's description of *Coleophora lineolea* is misleading and inaccurate, and could in fact apply to many species. However, Stainton, who saw the original specimens, established (1859, *Nat. Hist. Tineina*, 4: 250) *C. crocogramma* Zell. to be a synonym of *C. lineolea* Haw.; and since Zeller was co-editor of the above journal it is assumed that he must have agreed. Meyrick applied the name *lineolea* to quite a different species.—EDITOR.

broom and was found abundantly by sweeping this plant. From Dungeness, 11.vii.61, a single example of *Smicronyx coecus* (Reich) (Col., Curculionidae), found among about 40 *S. jungermanniae* (Reich). A sketch showing the tarsal claws of the two species was also shown.

Mr. S. WAKELY—Larval mines of *Lithocolletis scabiosella* Doug. (Lep., Gracillariidae) on *Scabiosa columbaria* L., found at Addington, Sussex, 5.viii.61.

Mr. R. W. J. UFFEN—Newly-made larval cases of *Nemotois fasciella* (F.) (Lep., Adelidae), from Chiswick, Middx.

COMMUNICATIONS.

Dr. C. G. M. DE WORMS said that Mr. A. J. Wightman had taken a specimen of *Celerio galii* Schiff. (Lep., Sphingidae), on thistles at Aviemore, Inv., during the latter part of July, and that Mr. Dixon had one at mercury vapour light near Winchester, Hants.

Mr. A. E. GARDNER remarked that during the 14 days he was at Aviemore, only one specimen of the burying beetle, *Necrodes littoralis* (L.) (Silphidae) came to the mercury vapour traps. On the previous two years it had not been uncommon during late July and early August.

Mr. D. H. HARVEY read a paper "Travelling in Anatolia during 1960", which he illustrated by coloured slides.

24th AUGUST 1961.

The PRESIDENT in the Chair.

EXHIBITS.

The PRESIDENT—Specimens of *Velia saulii* Tamanini (Hem., Veliidae) from Loch Morlich, Inv., August 1961. This species was recognised first in Britain in 1951. It occurs in the valleys of the Highlands and also occurs in the north of England. There is one record from Herts. It is less common than the Water Cricket, *Velia caprai* Tamanini, and the former species prefers larger expanses of water.

Mr. J. L. HENDERSON—*Chaetocnema aerosa* Letzn. (Col., Chrysomelidae) a species new to Britain. The single female was taken from Bookham Common, Surrey, 3.vi.61. For comparison he showed the following six species: *Chaetocnema confusa* Boh., *C. arida* Foud., *C. subcoerulea* Kuts., *C. hortensis* (Geoff.) *C. sahlbergii* (Gyll.) and *C. concinna* (Marsh.).

Mr. A. E. GARDNER—The following Cerambycidae (Col.) bred from larvae and pupae taken in the Aviemore, Inv., area, 27.vi. to 4.viii.61: *Rhagium mordax* (Deg.), *R. inquisitor* (L.), *R. bifasciatum* F., and *Acanthocinus aedilis* (L.).

Mr. M. G. MORRIS—The following Curculionidae taken on the Wrotham, Kent field meeting, 12.viii.61: *Apion millum* Bach., associated with *Prunella vulgaris* L., about a dozen examples were taken at one spot where the host plant grew by a patch of bare chalk. *Apion flavimanum* Gyll., associated with Labiatae on the chalk, especially

Origanum vulgare L., only three were taken by sweeping the food plant. *Apion atomarium* Kirby, associated with *Thymus* spp., three of the examples were taken by sweeping the food plant but the species is more usually obtained by searching at the roots of Thyme. *Miarus campanulae* L., associated with *Campanula rotundifolia* L., the specimens exhibited were found by searching the "bell" of the plant, the beetles are easily dislodged from the flowers and are lost if the plant is roughly handled.

Dr. C. G. M. de WORMS—Larvae of *Thera juniperata* L. (Lep., Geometridae) taken on Hackhurst Down on the Gomshall field meeting, 20.viii.61. Also larvae of *Eupithecia extensaria* Freyer (Lep., Geometridae) bred from ova obtained from specimens bred from the Norfolk coast by Mr. Percy Cue and exhibited on his behalf.

Mr. S. WAKELY—A series of *Caloptilia pyrenaecella* Chret. (Lep., Coleophoridae) which he had bred in June from larvae found on maple in the Isle of Wight, its only known British locality. Also a series of *Gracillaria semifascia* Haw. (Lep., Gracillariidae) were shown for comparison, both species occurring together on maple.

Mr. P. N. CROW—Thirteen species of Rhopalocera collected in a few days early in March, 1960, at Teneriffe, Canary Islands. The majority of species taken in Santa Cruz.

Mr. T. R. EAGLES on behalf of Mr. S. N. A. Jacobs—an inflorescence of *Zea mays* L. (Maize). The upper branching panicle usually contains male flowers only, but in this instance it had borne female flowers also and these had produced seeds. This phenomenon is described by Masters, M. T. (1869, *Vegetable Teratology*, p. 191). The plant shown was also abnormal in that one of the leaves had produced on either side small leaflets about 2½-inches long. The specimen was taken at Bromley Kent.

Mr. R. W. J. UFFEN—A copy of Haworth's *Lepidoptera Britannica* (1803). He read a number of amusing passages.

COMMUNICATIONS.

The LIBRARIAN reported that Sir Reginald M. Maxwell had presented seven volumes of the Bombay Natural History Society to the Society. They covered the years 1950 to 1956 inclusive. He also reported the purchase of volume 8, No. 1. of the Bulletin of the British Museum (Nat. Hist.) Entomology, Check-list and keys to the families and sub-families of the Hemiptera-Homoptera, by W. E. China and N. C. E. Miller.

Dr. C. G. M. de WORMS reported that few migrant Lepidoptera had been recorded. Mr. Morley had taken two examples of *Acherontia atropos* L. (Lep., Sphingidae) in Kent, and *Hoplodrina* (*Caradrina*) *ambigua* Schiff. (Lep., Noctuidae) was abundant in the Woking district of Surrey.

Mr. R. S. TUBBS said that when in Scotland he was very struck by the two colour forms of the female *Erebia aethiops* Esp. (Lep., Satyridae).

Mr. F. T. VALLINS remarked on the few Cuckoos heard this year. Members agreed and Dr. A. M. MASSE said that it had not been heard in the Maidstone district of Kent this year, the first time in living memory. Mr. Vallins also related how he observed a female Robin unable to regain her nest because of his presence, going through the actions of squatting on the eggs. He thought the action was automatic. Mr. A. E. GARDNER disagreed saying that he thought the bird was feigning injury to distract attention from the nearby nest.

14th SEPTEMBER 1961.

The PRESIDENT in the Chair.

The following new members were declared elected: Mr. P. J. Rogers and Mr. S. A. Williams.

EXHIBITS.

The PRESIDENT—(1) *Lilioceris lili* (Scop.) (Col., Chrysomelidae) found feeding on *Lilium bellingham* hybrid in an area of Battleston Hill, Woking, Surrey, 4.ix.61. The beetle was first recorded in Britain many years ago, but became scarce until about 20 years ago when it became more plentiful in the Woking district. (2) *Saldula c-album* (Fieber) (Hem. Saldidae). The bug occurs in almost all northern counties and is locally common in Scotland. It normally occurs under stones, shingle and boulders at the margins of rivers, and is often found in company with other species of the family Saldidae. The exhibited examples were taken on the banks of the river Nethy in the Scottish Highlands.

Mr. A. E. GARDNER—(1) The following Coleoptera from Braunton Burrows, Devon: *Cicindela maritima* Dej., *Eurynebria complanata* (L.) and *Agonum marginatum* (L.) (Carabidae); *Cardiophorus asellus* Er. (Elateridae); *Cylindronotus pallidus* (Curt.) (Tenebrionidae); *Geotrupes vernalis* (L.) (Scarabaeidae); *Chrysolina haemoptera* (L.) (Chrysomelidae); and *Sitona grisea* F. (Curculionidae). (2) A living *Blaps mucronata* Lat. (Col., Tenebrionidae) from the basement of Pepys House, 14.ix.61.

Mr. R. W. J. UFFEN—(1) Larvae and cases of a coleophorid moth on *Chenopodium* seeds from Chiswick, Middx., thought to be *Coleophora clypeiferella* Hof. The cases were completely covered with whole florets. (2) A living *Lipoptena cervi* (L.) (Dipt., Hippoboscidae) taken at the Knole Park, Kent, field meeting, 9.ix.61. (3) Two thousand sepsid flies, a sample from an aggregation estimated at 100,000 individuals of both sexes, found at the same meeting.

Mr. S. WAKELY—The following insects: (1) Larvae of *Cucullia absinthii* L. (Lep., Noctuidae) found on *Artemisia absinthium* L. in his garden at Camberwell, S.E. London. (2) *Apamea scolopacina* Esp. (Lep., Noctuidae) bred from a larva taken on the Otford field meeting. (3) *Strangalia quadrifasciata* (L.) (Col., Cerambycidae) taken on the Godalming field meeting. (4) *Carabus nitens* L. (Col., Carabidae) taken at Parley Heath, Dorset, 28.viii.61.

Mr. A. PRICE—*Gyrinus natator* (L.) (Col., Gyrinidae) cocoons. Five cocoons were shown including a specimen of *G. natator* (L.) which emerged from one of the cocoons, 6.viii.61. They were found on the concrete sides of a static water tank, some six inches above the water, at Pembrey, Carm. Also one cocoon of a *Gyrinus* sp. on *Juncus* sp., found at Mynydd-Y Garreg, Carm., in August 1959.

COMMUNICATIONS.

Mr. C. N. HAWKINS said butterflies were now scarce: he had seen only one *Vanessa atalanta* L. (Nymphalidae) in his garden, and a single *Aglais urticae* L. (Nymphalidae) hibernating in his house. He had also seen a single male *Celastrina argiolus* L. (Lycaenidae) and the moth *Mormo maura* L. (Noctuidae).

Nycterosia obstipata F. (Lep., Geometridae) was reported by Mr. B. GOATER from Mill Hill, Middx., 5.ix.61.

Amathes agathina Dup. (Lep., Noctuidae) was said to be abundant and *A. castanea* Esp. was also reported to be common. Amongst the immigrants the following species were mentioned: *Rhodometra sacraria* (Geometridae), *Leucania vitellina* Hübn. and *L. albipuncta* Schiff. (Noctuidae), *Utetheisa pulchella* L. (Arctiidae), and *Plusia gamma* L. (Noctuidae) was seen in thousands on the Isle of Wight recently.

28th SEPTEMBER 1961.

The PRESIDENT in the Chair.

EXHIBITS.

The PRESIDENT—The rare and very local lygaeid bug *Drymus latus* Dougl. & Scott, which was recorded for the first time in Kent in September 1921, when the late E. C. Bedwell caught three examples in moss at St. Margaret's Bay. It has not been found again until this month, when seven examples were obtained in thick grass and moss in a chalky situation at Coney Hill, Chatham. (2) *Lathridius bifasciatus* Reitt. (Col., Lathridiidae) an Australian beetle first recorded at Esher, Surrey, in October 1951. Since that time it has spread rapidly in Surrey, Kent and Sussex, and is abundant amongst all types of vegetation in the East Malling district of Kent.

Mr. A. PRICE—Three examples of *Helichus substriatus* Müll. (Col., Dryopidae) taken in a well-oxygenated pool in the river Gwendraeth at Kidwelly, Carm., 13.viii.61. Five examples of *Dryops luridus* Er., were also shown for comparison. These were taken in a slow flowing ditch at the Royal Ordnance Factory, Pembrey, Carm., 15.viii.61.

Mr. M. G. MORRIS—Some of the weevils (Col., Curculionidae) collected during a week's holiday in the Isle of Wight, September 1961: *Apion laevicolle* Kirby, a local species found in some numbers at Culver Cliff, 15.ix., Sandwich and Deal, Kent, are also well-known localities for this species; *Cathormiocerus socius* Boh. a specialty of the Island, only one example was found at Culver Cliff, 15.ix; *Sitona waterhousei* Walton,

a species which seems to be commoner in the west than in the east, one example taken at Ventnor, 14.ix; *Mononychus punctum-album* (Herbst), a well-known speciality of the Island, abundant in the seed pods of *Iris* on Niton undercliff, 14.ix; *Ceuthorrhynchidius darsoni* Bris., a local species associated with *Plantago coronopus* L. (Buck's-horn Plantain), and taken very sparingly at Ventnor, 14.ix., and Culver Cliff, 15.ix and 16.ix.

Mr. A. E. GARDNER—(1) A series of the rare beetle *Boletophagus reticulatus* (L.) Tenebrionidae) bred from *Fomes fomentarius* Karst. on birch in Blackwood, Rannoch, Perthshire, 24.vii.61. (2) A series and one larva of *Pytho depressus* (L.) (Pythidae) bred from larvae found under the bark of Scots Pine at Glen Afric, Inv., 28.vii.61.

Mr. T. R. EAGLES—(1) *Lobaria pulmonaria* (L.) Hoffm. (Tree Lungwort) from Kyle of Lochalsh, Ross & Cromarty, a lichen formerly used on the Continent to cure coughs. (2) *Hymenophyllum wilsoni* Hook. (Wilson's Filmy Fern), the fronds of which had sori in different stages of development, from Ben Tarmachan, Killin, Perthshire. (3) Fronds of *Thelypteris lonchitis* (L.) Roth. (Holly Fern) also from Ben Tarmachan.

Mr. S. N. A. JACOBS—Larvae of the tortricid moth *Eucosma maritima* Westw., together with a spray of *Artemisia maritima* (L.) (Sea Wormwood) from Cuckmere Haven, Sussex, showing the feeding galleries of the larvae among the florets.

COMMUNICATIONS.

The LIBRARIAN announced the acquisition of the 79th, 80th and 81st Annual Report of the Lancashire & Cheshire Natural History Society and *The Geology of Norfolk*, published by the Norfolk and Norwich Natural History Society.

SPECIAL MEETING.

Held at Pepys House at 6 p.m., 28th September 1961.

The PRESIDENT in the Chair.

The PRESIDENT opened the meeting by reading the following motion: "The use of the designation—The South London Entomological & Natural History Society—shall be discontinued as from midnight on 31st December 1961, and be replaced by—The British Entomological & Natural History Society".

The motion was moved by Mr. F. D. BUCK who drew attention to the referendum which the Council had caused to be taken; 359 replies had been received out of a total membership of 524, and had resulted as follows: in favour of changing the name 229, against 121, unmarked papers received 9. Mention was made of the failure of Institutions to recognise the nature of the Society's membership as against individual recognition.

Dr. B. P. Moore seconded the motion.

Opposition centred around the desirability to retain the name which the Society had held so long and the possible damage which could be caused by changing.

The voting on the motion was: for 23, against 32. The PRESIDENT then declared the motion lost.

The next item of business concerned the amendments to the By-laws recommended by the *ad hoc* sub-committee set up by the Council. The circulated amendments were moved *en bloc* by Mr. R. M. MERE and seconded in several places. The motion was carried by an overwhelming majority.

12th OCTOBER 1961.

The PRESIDENT in the Chair.

EXHIBITS.

The PRESIDENT—Three examples of the clavicorn beetle, *Dendrophagus crenatus* (Payk.) (Cucujidae) which were bred from larvae found under birch bark on the Burma Road, Aviemore, Inv., 30.vii.61. The species, which is very active in the larval state, lives under the loose bark and is probably predaceous on other wood-boring larvae. It is very local and is recorded only from Scotland.

Mr. R. W. J. UFFEN—Larvae of *Coleophora artemisicolella* Bruand, *C. fuscocuprella* H.-S., and first instar linear mines with older larvae of *C. badiipennella* Dup. (Lep., Coleophoridae).

Mr. A. E. GARDNER—(1) A series of the rare water beetle *Graphoderus cinereus* (L.) and *Dytiscus circumflexus* F. from Woolmer, Hants, 2.x.61. A typical male and a sulcate female (v. *dubius* Serv.) were shown of the latter species, and also a smooth female which is very rarely found in Britain. (2) A series of *Ctenicera* (*Corymbites*) *pectinicornis* (L.) (Col., Elateridae) from Etheron Valley, Cheshire, 29.v.61, collected by Mr. C. Johnson.

Mr. M. G. MORRIS—Examples of *Apion semivittatum* Gyll. (Col., Curculionidae) from *Mercurialis annua* L. growing in allotments, Queen's Road, Maidstone, West Kent. Mr. A. A. Allen in a recent note (1961, *Ent. mon. Mag.*, 97: 21) describes this species as "... one of the most local of our species of this very large genus ..." and enumerates the records, which in his note are not complete. He omits the record of J. A. Parry (1954, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1952-53: 43) for Canterbury and also that of J. A. Stephens for Chatham. The publication of Stephens record cannot be traced but it was known to several coleopterists. On the Higham field meeting (see p. 90), Dr. Massee took two examples of this weevil from *M. annua* L. and another was taken by the exhibitor. Since then, Dr. Massee has found a single example at East Malling, Kent, and the exhibitor has found it abundantly at Maidstone; all three places are new localities.

In the textbooks (Fowler, Hoffman, etc.) the species is said to occur in the autumn, although Parry (*loc. cit.*) took his in July. On the Continent, *A. semirittatum* Gyll. has a wide distribution and it seems a little odd that it should be so local with us. On the other hand, Clapham, Tutin and Warburg (1952, *Flora of the British Isles*, Cambridge, p. 681) treat *M. annua* L. as only doubtfully native so that the weevil may be a comparatively recent arrival in this country.

Mr. H. R. LAST—An example of a species of Staphylinidae (Col.) new not only to Britain but also to science. About three months ago the Rev. C. E. Tottenham showed the exhibitor an example of a new species of *Philonthus* taken at Ulcombe, Kent, this year in chicken food by Mr. Light. A description will shortly be published in the *Ent. mon. Mag.* under the name of *Philonthus felix* Tott. It is rather strange that the exhibitor's son brought home from his holidays two staphylinids from Egerton, Kent, of which one was the common *Quedius loricollis* (Brullé) and the other this new species. Fortunately, it was a male, and the aedeagus proved its identity beyond doubt. In every way it is identical with *Philonthus cephalotes* (Grav.), except that the alutaceous microsculpture of the head is more broken and irregular and on the pronotum it is absent on the disc and is only irregularly evident elsewhere—it therefore gives a more shining appearance. The arrangement of pegs on the paramere is very different from *P. cephalotes* (Grav.), but this does bear some resemblance to *Philonthus pachycephalus* Nordmann; examples of both these other species were shown for comparison. It may repay coleopterists to look through their series of *P. cephalotes* (Grav.) especially those from Kent.

Mr. L. PARMENTER—A selection of Empididae (Dipt.) as follows: *Empis tessellata* F., *E. nigritarsis* Meig., *Syneches muscaria* F., *Tachydromia pallidiventris* Meig., *Stilpon sublunata* Collin, *Hilara pilosa* Zett., *Ramphomyia sulcata* (Meig.), *Sciodus arrogans* L., *Microphorus crassipes* Macquart and *Chersodromia arenaria* (Halliday).

COMMUNICATIONS.

Comment was made on migrant Lepidoptera; *Utetheisa pulchella* L. (Arctiidae) had been appearing sporadically, some 20 records having been made to date this year, ranging from Cornwall to Kent, two examples had been taken at Dungeness, Kent, this month, and the species had been seen in southern Scotland and southern Ireland. Other migrants mentioned included the noctuids *Plusia chalcites* Esp., *P. orichalcea* F. (*aurifera* Hübn.), *Leucania vitellina* Hübn. and *L. unipuncta* Haw., also the geometer *Rhodometra sacraria* L. and the pierid *Colias croceus* Fourc..

Capt. N. D. RILEY drew attention to the imminent publication of the revised International Rules for Zoological Nomenclature in parallel English/French translations. The expected cost was about £1.

Mr. R. REID, A.M.I.C.E. showed a coloured film of a holiday in East Africa, with special reference to the game reserve.

28th OCTOBER 1961

THE ANNUAL EXHIBITION—RECORD OF EXHIBITS

Mr. A. A. ALLEN (Visitor)—Two very rare British Beetles, both recent additions to the Fauna. (1) *Leistus rufomarginatus* (Duft.), a carabid which had been recorded only twice previously in Britain, single examples having been found at Sevenoaks, Kent, in 1942, and at Bury St. Edmunds, Suffolk, in 1954. A few specimens, of which this was one, have been taken between 1958 and the present year, at Holkham, Norfolk, by Mr. C. S. Barham. The beetle occurs in wooded areas, under stones, leaves, bark, etc. (2) *Stenelmis canaliculata* Gyll., the largest of the British Elmidae yet known. This species was discovered in Lake Windermere in July 1960, by Mr. A. Amsden (see Claridge, M. F. & Staddon, B. W., 1960, *Ent. mon. Mag.*, **96**: 141-144). Canon W. W. Fowler had suggested as long ago as 1889 (*Col. Brit. Is.*, **3**: 375) the probability of its occurrence in this country. The beetle is found in only one small area of the lake, under flat stones, in about 18 inches depth of water.

Sir ERIC ANSORGE—see Dr. C. G. M. de Worms.

Mr. J. V. BANNER—Lepidoptera bred during 1961 as follows: *Orgyia recens* Hübn., S. Yorks.; *Cirrhia gilvago* Schiff., Taunton district of Somerset; *Hadena contigua* Schiff., Ashdown Forest, Sussex; *Gortyna (Hydraecia) petasitis* Doubl., from pupae taken in E. Hants; *Eremobia ochroleuca* Schiff., from larvae taken in Sussex; *Dysstroma truncata* Hufn., from ova obtained from a female taken at Ashurst, Sussex; *Ennomos autumnaria* Wernh., an aberration bred from an egg obtained from a female taken at Ashurst.

Mr. S. BEAUFOY—A series of photographs as follows: the life history of the dragonfly *Anax imperator* Leach; the emergence of the dragonfly *Libellula depressa* L.; the life history of the butterfly *Apatura iris* L.; and a set of colour prints in Ektacolor.

Dr. NEVILLE L. BIRKETT—(1) Continental butterflies: *Erebia aethiops* Esp. from Bavaria and the Tirol; *E. pronoe* Esp. from Voralberg and the Tirol; *Satyrus dryas* Scop. from Murnau, Bavaria; *Maculinea arcas* Rott. from Murnau; two examples of *Mellicta aurelia* Nickerl with British data, but probably of Continental origin. (2) British moths: *Craniophora ligustri* Schiff., from N. Lancashire and S. Westmorland; *Discoloxia blomeri* Curt., from Witherslack, Westmorland, and *Apocheima hispidaria* Schiff., from N. Lancashire; *Dasychira fascelina* L., from Sandscale, N. Lancashire; *Leucoma salicis* L., also from Sandscale; *Atolmis rubricollis* L., from Newby Bridge, N. Lancashire; *Pterophorus (Alucita) spilodactyla* Curt., bred from larvae from Deganwy, N. Wales; a series of *Acleris (Peronea) comariana* Zell., bred from larvae in Marsh Cinquefoil, Ratherheath, near Kendal, Westmorland, showing most of the named British forms and including two examples of the typical form reputed by Sheldon not to occur in Britain. (3) Chironomidae (Dipt.). A small selection of species from the Lake District: *Pentaneura carnea* (F.), *Microtendipes tarsalis*

Walker, *Pentapedilum* (*Sergentia*) *coracinus* Zett., *Cryptochironomus* *liannulatus* Staeger, *Cryptochironomus* (*Harnischia*) *vulneratus* Zett., *Polypedilum* *laetus* Meig., *Glyptotendipes* *griepkoreni* Kieffer and *Stictochironomus* *pictulus* Meig.

Mr. C. S. H. BLATHWAYT—Some examples of *Luperina testacea* Schiff. (Lep., Noctuidae) taken at Weston-super-Mare, Somerset, showing considerable variation, together with two moths of a similar species also from Weston-super-Mare.

Mr. E. L. BOLTON and Mrs. M. V. BOLTON—Rhopalocera as follows: *Aricia agestis* Schiff., a striking example of a female ab. *graafi* Huell, caught in Surrey, September 1960 (E. L. Bolton); *Anthocharis cardamines* L., two males, one having very broad black tips to the forewings and with the adjoining area yellow instead of orange (E. L. Bolton), the other is presumably ab. *schepdaeli* Derenne, having a black costal streak on each forewing from the base to beyond the discoidal which is continued as a broken line into the forewing tips (Mrs. M. V. Bolton), both caught in Sussex, April 1960; *Maniola jurtina* L., ab. *antiexcessa* Leeds, female taken in August 1960 in Surrey (Mrs. M. V. Bolton); *M. tithonus* L., male ab. *mincki* Seebom., caught July 1961 in Hants (E. L. Bolton); *Lysandra bellargus* Rott., female showing the characteristics of ab. *glabrata* B. & L. of *Lysandra coridon* Poda, caught September 1961, in Dorset (Mrs. M. V. Bolton); *Polyommatus icarus* Rott., male ab. *opalizans* Frohawk caught September 1961, in Dorset (Mrs. M. V. Bolton); *Aglais urticae* L. ab. *discolor* Heine. + *tripunctata* Rayn. male with interesting borders, bred from wild larva from Gloucestershire, August 1960 (E. L. Bolton); another *A. urticae* L. with blacked-in central areas on forewings rather more extreme than ab. *polaris* Staud., it possibly approaches ab. *connexa* Butler (*japonica* Fisch.), caught September 1961, in Dorset (E. L. Bolton).

Mr. S. R. BOWDEN—(1) Specimens of *Pieris napi* L., *P. bryoniae* Ochs. and hybrids, illustrating genetic polymorphism at the locus of the hybrid *sulphurea* Schoyen. The gene controls the alternative ground-colour pigmentation, lemon-yellow/white, but not the ochreous biochrome present in many of the females. Dominance is in the order, all-white (hybrid *subtalba* Schima) > parti-coloured (wild type) > very pale yellow replacing white (Thompson's form) > all-yellow (Head's form). The balanced polymorph "*subtalba*" is probably allelic with the recessive yellow forms; if not, it is very closely linked. (2) Insects produced by a single hybrid *sulphurea* Schoyen female paired with a hybrid *subtalba* Schima male heterozygous for *sulphurea*. All are either *subtalba* or *sulphurea*; so far there has been no crossing-over (which would produce wild-type). Both parents were heterozygous for the recessive "albino", which has segregated independently. Swiss, Carinthian and British stocks were used. The deficiency of males in the partial emergence is to be noted (63 females and 6 males, with 45 pupae lying over the winter).

Mr. R. F. BRETHERTON—(1) A new subspecies of *Zygaena lonicerae* von Scheven; a long series, bred 25.vi. to 4.vii.61, from pupae collected

12.vi.61 in the Island of Skye. *Z. lonicerae* has not hitherto been reliably recorded from anywhere in Scotland. The new subspecies differs strikingly from the English *Z. lonicerae* s.sp. *transferens* Verity, examples of which were shown for comparison. It is probably nearest to *Z. lonicerae* s.sp. *insularis* Tremewan from Northern Ireland. (2) Scarce migrants taken in 1961: *Herse convolvuli* L., male, Studland, Dorset, at tobacco flowers, 30th September; *Celerio galii* Schiff., female (eggs infertile), Ottershaw, Surrey, at light, 25th July; *Leucania vitellina* Hübn., male, Torcross, Devon, at light, 3rd October; *Nycterosia obstipata* F., four, Ottershaw, at light, 12th July, 2nd and 3rd September and 15th October; *Diasemia ramburialis* Dup., two, Ottershaw, at light; ?*Heterographis oblitella* Zell., Ottershaw, indoors, 14th August. (3) Aberrations: *Notodonta dromedarius* L., extreme melanic, Onich, Inv., 8.vi.61; *Rhizedra lutosa* Hübn., male with spots on all wings joined so as to form slender zig-zag lines; *Gortyna (Hydraecia) micacea* Esp., very pale red male, Ottershaw, 23.viii.61. (4) Selected Lepidoptera caught in 1961, the more notable being: *Carterocephalus palaemon* Pall., Fort William, Inv., 10th June; *Pieris napi* L., dark females, Isle of Skye, 12th June; *Zygaena filipendulae* L., large form, bred, Skye; *Catoptria permutatella* H.-S. and *Crambus myellus* Hübn., Calvine, Perthshire, 16th June; *Arenostola brevilinea* Fenn, *Celaena haworthii* Curt. and *Pelosia muscerda* Hufn., Norfolk Broads, 2nd to 9th August; *Pediasia (Crambus) fascelinella* Hübn., Horsey, Norfolk, 7th August; *Amathes agathina* Dup. and *Eucoa tritici* L. (heath race), Thursley, Surrey, 2nd September; *Tethea fluctuosa* Hübn., Surrey Downs, 11th July; *Scopula rubiginata* Hufn., and *Anepia irregularis* Hufn., Breck, Suffolk, 10th August, and bred; *Heliophobus albicollis* Hübn., Frensham, 19th May.

BRITISH MUSEUM (NAT. HIST.)—A series of line drawings of aradid bugs by Mr. Arthur Smith, and a series of photographs of various insects taken by Mr. J. B. Brown in the museum studio.

Miss W. M. A. BROOKE—A selection of drawings of various marine animals, mostly in pencil.

Mr FREDERICK C. BROWN—Adult and young of the Smooth Snake (*Coronella austriaca* Laurent). Adults from the coastal areas of Dorset in August, 1961; young born from them in September 1961. This snake is the least known of the British species and was first recorded by Dr. J. E. Gray in 1859, when a specimen was taken near Bournemouth, Hants. Its distribution in England is confined mainly to Dorset and Hampshire, although in the past it has been recorded from Devon, Kent, north Wiltshire, Surrey and Sussex. It is widely distributed on the Continent. Although not often seen, the Smooth Snake is by no means rare where it occurs, and a diligent search of any of its localities is usually rewarded by the sight of several specimens. Its chief food is the Sand Lizard, but the Viviparous Lizard and Slow-worm are also taken, as are young field mice, voles and shrews. Young specimens take spiders and insects, but there is no record of amphibians or fish being eaten. In England, this snake is an in-

habitant of heaths and semi-wooded country, usually on sandy soil. It may be found within a hundred yards of the sea shore, but only where there is a thick carpet of heather covering the ground. It is said to be a lover of water; many specimens are certainly found in boggy areas where they have been recorded as having taken to the water when disturbed. It burrows freely in loose soil, and this habit may be one of the reasons why it is only rarely seen. The Smooth Snake is less active in its habits than the Grass Snake or the Viper and makes little or no attempt to avoid capture. It has been known to bite when first handled, but soon becomes tame in captivity, and has been known to take food whilst being held in the hand. Several writers have stated that it will emit an offensive smell when first caught. The young when born carry a reserve of fat that enables them to live through the winter and even to grow a little.

Mr. F. D. BUCK—A series of line drawings on both Bristol Board and on Scraper Board to illustrate a paper on Central African Anthicidae (Col.).

Mr. B. S. BURNS—Two male *Euphydryas aurinia* Rott., captured in S. E. Hampshire, in May 1961. One, which was captured on 20th May, has the central and inner areas of both fore and hindwings suffused with black. The second specimen has several black markings missing from the central area of both forewings, leaving a yellow band. The hindwings of the latter specimen are both normal. It was captured on 22nd May.

Mr. C. J. CADBURY—see Dr. H. B. D. Kettlewell.

Mr. S. E. W. CARLIER—Two fairly recent immigrant species which appear to be extending their range here. (1) *Lozotaenoides (Eulia) formosana* Fröl. First taken in N. W. Surrey, 4.viii.45 by Mr. R. W. Parfitt, and again on 26.vii.46 and 1.viii.46. It was recorded from Canterbury, Kent, in 1947, and by 1956 had spread to various localities from Kent to Hants and the Isle of Wight. On 2nd July last year, two examples came to mercury vapour light by the edge of a mixed conifer plantation near Tuddenham, Suffolk, and six more occurred again this year at the same place on 30th June. These, it is believed, are the first recorded from north of the Thames. (2) *Ptycholomoides (Cacoecia) aeriferana* H.-S. Recorded by Dr. E. Scott at Westwell, Ashford, Kent, in 1951, and again in 1952 and 1953; and by Mr. Wakely from Elham Park Woods, 8.vii.53, and also in 1955. It has also been recorded from Brook, Wye, Kent. Mr. R. Fairclough recorded it from Balcombe, Sussex, in 1954, and Mr. J. H. Styles from Harling Forest, Norfolk, in 1955. A single example came to light near the same mixed conifer plantation at Tuddenham, 1.vii.60, four more on 24th June this year, and a further four appeared on the 30th.

Mr. J. M. CHALMERS-HUNT—An original series of humorous drawings with pen and ink, made while the exhibitor was in India during 1945-6, depicting entomology in the East.

Mr. H. E. CHIPPERFIELD—Short series of the following Lepidoptera: *Endromis versicolora* L. and *Selenia lunaria* Schiff. both bred from ova

obtained from Aviemore, Inv., during 1960; *Leucania albipuncta* Schiff., *Scopula rubiginata* Hufn., *Sterrrha ochrata* Scop., *Anerastia lotella* Hübn., *Epischnia* (*Phycita*) *boisduraliella* Guen., *Nyctegretis achatinella* Hübn., *Agriphila* (*Urambus*) *latistria* Haw., *Batia lambdella* Don. and *Blastobasis decolorella* Woll. all captured on the Suffolk coast; *Catocala sponsa* L., bred from ova deposited by a New Forest, Hants, female captured by Mr. P. J. Burton in 1960.

Mr. E. W. CLASSEY—Some interesting species and aberrations of macrolepidoptera, taken wild in Feltham, Middx., including: *Thymelicus lineola* Ochs., *Dasychira fascelina* L., *Euschesis interjecta* Hübn., a specimen of *Anchoscelis litura* L., taken on 20th July, and extreme aberrations of *Arctia caja* L. and *Apamea monoglypha* Hufn., both of which have been given to the National collection (Rothschild-Cockayne-Kettlewell coll., Tring). (Pl. II, fig. 3).

Mr. G. A. COLE—The following Lepidoptera bred or caught during 1961: *Perizoma sagittata* F., bred from larvae found in Nottinghamshire during August 1960; *Plusia bractea* Schiff., bred from eggs laid by a female taken at Aviemore, Inv., 26.vii.61, kept throughout at a temperature of about 70° F., from a total of 71 eggs, 35 full-sized specimens emerged during September; *Nycterosia obstipata* F., bred from a female taken at Abinger, Surrey, 8.vii.61; a caught series of *Carsia sororiata* Hübn. (*paludata* Thunb.), from Aviemore; two male *Epione vespertaria* L. (*parallelaria* Schiff.), taken in Yorkshire, 19.vii.61; an aberration of *Deuteronomos erosaria* Schiff., taken 4.viii.61, and a pale second brood specimen of *Euphyia unangulata* Haw., taken 28.viii.61, both from Abinger, Surrey.

Major A. E. COLLIER—(1) Aberrations of Rhopalocera taken or bred in Surrey during 1961: *Maniola jurtina* L. ab. *excessa* Leeds, male and female undersides and a male upperside; *M. jurtina* L. ab. *partimtransformis* Leeds, a male upperside; *Coenonympha pamphilus* L. ab. *antiexessa* Leeds, a male and a female; *Pararge aegeria* L., a very dark male, 1.ix.61; *Aphantopus hyperantus* L. ab. *lanceolata* Shipp, four bred females from Surrey stock; *Pyrgus malvae* L. ab. *taras* Bergstr. (2) A series of asymmetrical specimens taken between 1956 and 1961 including two *Lysandra bellargus* Rott., *L. coridon* Poda, *Glossiana selene* Schiff., *Maniola jurtina* L., *Coenonympha pamphilus* L. and *Thecla betulae* L. (see Pl. II, fig. 4).

Mr. S. COXEY—Lepidoptera from Aviemore, Inv.: *Hadena bombycina* Hufn., *Apatele menyanthidis* View., *A. euphorbiae* Schiff. s.sp. *myricae* Guen., *Anarta melanopa* Thunb., *Isturgia carbonaria* Clereh, *Electrophaes corylata* Thunb., and *Thera cognata* Thunb. From Lydd, Kent: *Nonagria sparganii* Esp., *N. geminipuncta* Haw., *N. dissoluta* Treits. with the pale Wicken form for comparison, and *Scopula promutata* (Guen.) (*conjugata* Borkh., *marginepunctata* Goeze auctt. nec Goeze). From Brecknockshire: *Mythimna turca* L., *Oleorodes lichenaria* Hufn., and *Plusia interrogationis* L. From Bolton, Lancs.: *Apatele alni* L. melanice form, and *Cucullia absinthii* L. From Walney Island, Lancs.: *Celerio galii* Schiff., taken at the lighthouse. From

Burnt Wood, Staffs.: a bred example of *Bomolocha crassalis* F. From Bury St. Edmunds, Suffolk: a bred example of *Pareulype berberata* Schiff. From Wood Walton Fen, Hunts.: *Lygephila pastinum* Treits., *Sterrhia emarginata* L., *Scopula immutata* L. From Uppingham, Rutlandshire: a rayed form of *Spilosoma lubricipeda* L. From Studland and Swanage, Dorset: *Dasypolia templi* Thunb., *Eumichtis lichenea* Hübn., *Lithophane leautieri* Boisd., *Leucania l-album* L. and *L. vitellina* Hübn.

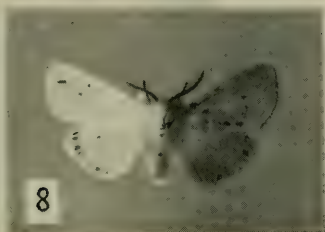
Mr. P. CUE—An example of *Utetheisa pulchella* L. from Dungeness, and a series of *Eupithecia innotata* Hufn., which had fed on *Hippophae rhamnoides* L. (Sea Buckthorn).

Mr. C. F. DOLLIMORE—An example of *Utetheisa pulchella* L., taken at mercury vapour light in the New Forest, Hants, 1.ix.61; three examples of *Moma (Diphthera) alpium* Osb., from the New Forest, 2.vii.61, with three bred specimens, which were in pupa for 30 days without abnormal heating; they pupated 22.viii.61 and emerged 22.ix.61.

Mr. R. C. DYSON—Lepidoptera taken or bred during 1961: *Maniola jurtina* L., two albinistic specimens taken in Sussex and Wilts.; *Polyommatus icarus* Rott., four specimens bred from a normal female, all four specimens showing on the undersides elongation or joining of the spotting to full ab. *confluens* Tutt; *Hada nana* Hufn., an unusually marked specimen, Sussex, 3.vi.61, with a normal specimen for comparison; *Agrotis denticulata* Haw. (*cinerea* Schiff. nec Hufn.), a black female, taken at mercury vapour light, Sussex, 3.vi.61, the first female to be taken at light by the exhibitor and a most unusual occurrence; *A. ripae* Hübn., a series bred from larvae collected in north Lancs.; *Apamea sordens* Hufn., with heavy cross bands on forewings, Brighton, Sussex, 5.vi.61, with a normal specimen for comparison; *Leucania albipuncta* Schiff., Pevensey, Sussex, 19.viii.61; *Arenostola pygmina* Haw., a series showing wide variation in ground colour from buff to copper, Sussex, August and September; *Gortyna (Hydraecia) petasitis* Doubl., three specimens bred from pupae collected in east Hants; *Cryphia perla* Schiff., a series taken at mercury vapour light during normal emergence period, July to August, in a garden at Brighton and a further series from same locality taken in September, with some dark forms; *Eumichtis lichenea* Hübn., a series of the pale silvery form bred from larvae collected at Freshwater, Isle of Wight, in March 1961; *Lithophane leautieri* Boisd., from the Isle of Wight, 7.x.61; *Saturnia pavonia* L.

ANNUAL EXHIBITION, 28th October 1961.

1. *Apatura iris* L. ab. *sari* Heslop, Mrs. E. A. Heslop.
2. *Apatura iris* L. ab. *sorbioduni* Heslop, Mr. I. R. P. Heslop.
3. *Arctia caja* L. aberration, Mr. E. W. Classey.
4. *Aphantopus hyperantus* ab. *lanceolata* Shipp, Major A. E. Collier.
5. *Agrotis exclamatonis* L., female aberration, Dr. J. R. Langmaid.
6. *Drymonia dodoneae* Schiff. (*trimacula* Esp.), Mr. J. L. Messenger.
7. *Lycaena phlaeas* L., aberration, Mr. D. L. Young.
8. *Cynia mendica* Clerck, gynandromorph, Dr. C. G. M. de Worms.



a specimen with irregular colour of wing pattern, exhibited on behalf of Antony Hemmingsley.

Mr. T. R. EAGLES—Fronds of some of the species of British ferns: *Blechnum spicant* (L.) Roth. (Hard Fern), Tilgate Forest, Sussex; *Phyllitis scolopendrium* (L.) Newm. (Hart's-Tongue Fern), Helston, Cornwall; *Asplenium viride* Huds. (Green Spleenwort), Kyle of Loch Alsh, Ross and Cromarty; *Athyrium filix-femina* (L.) Roth. (Lady Fern), Ilfracombe, Devon; *Dryopteris borreii* Newm. (Scaly Male Fern), Leith Hill, Surrey; *D. spinulosa* (Mull.) Kuntze (Narrow Buckler Fern), Killarney, Ireland; *D. dilatata* (Hoffm.) A. Gray (Broad Buckler Fern), Ilfracombe; *D. acmula* (Ait.) Kuntze (Hay-Scented Buckler Fern), Crawley, Sussex; *Polystichum setiferum* (Forsk.) Woynar (Soft Shield Fern), Seaton, Devon; *P. lonchitis* (L.) Roth. (Holly Fern), Ben Tarmachan, Perthshire; *Thelypteris oreopteris* (Ehrh.) C. Chr. (Mountain Fern), Tilgate Forest; *T. phegopteris* (L.) Slosson (Beech Fern), Kyle of Loch Alsh; *Polypodium vulgare* L. (Polypody), Lyme Regis, Devon.

Mr. NIGEL T. EASTON—(1) One of the four *Anthocharis cardamines* L. which were found at Mortimer, Berks., as fully fed larvae, 18.vi.59, on the seed pods of *Hesperis matronalis* L. (Sweet Rocket). This female, which passed 20 months in the pupal stage under normal breeding conditions, shows abnormal black marginal markings on the hindwings and was bred on 12.iv.61. The batch of four larvae was probably the progeny of a single female, and, as described (1961, *Ent. Rec.*, **73**: 32-33 and 165-166), produced a normal female on 1.x.60, a normal male on 14.iv.61, a normal female on 17.iv.61, and the female exhibited on 12.iv.61. All were of normal size. No other larvae of the species were found in the exhibitor's garden in 1959 even after a thorough search and, in 1960, the butterflies were flying around 12th May. The exhibitor had never seen this form of the Orange Tip and presumably it is uncommon. (2) An aberration of *Cosymbia albipunctata* Hufn., with rosy pink suffusion covering the base and almost the whole of the forewings, except the margin. This appears similar to ab. *decoraria* Newman, which occurs in Kent and Surrey. The specimen shown was taken at rest on a Scots Pine trunk in S. Berks., 12.vi.60. (3) A small but representative series of *Euphydryas aurinia* Rott., bred from small larvae found feeding individually in a new and very restricted breeding ground, 25 and 26.iii.61, in S. Berks. It can be seen that one of the chief characteristics of this small colony is the partial, and sometimes total, eclipse of the straw-coloured, sub-marginal, lunular spots on the hindwings by heavy black scaling. In some cases these almost totally obscured spots appear blue instead of yellow. The series approximates, in the intensification of the black marking on all wings, to the northern forms of this variable butterfly and a pair from the Somerset peat deposits was also shown for comparison. There is one striking, though not extreme, aberration in which the forewing black marginal spots show a tendency to streak inwards and, in addition, the black band just outside the discal is completely absent, whilst the marginal lunular spots on the hindwings are reduced to tiny pinpoints by a heavy black

border, characteristic of this colony. Bred individuals have, of course, been liberated on the original habitat.

Mr. R. C. EDWARDS—Some moths taken near Rannoch, Perthshire, between 4 and 12.ix.61, several in good condition, a full month later than normal time of appearance: such as *Apamea assimilis* Doubl., *A. furva* Schiff., s.sp. *britannica* Cockayne, and *Entephria flavicinctata* Hübn. Others shown were: *Cirrhia icteritia* Hufn., *Celaena leucostigma* Hübn., *Euxoa nigricans* L., *Aporophyla lutulenta* Schiff., *A. lunula* Stroem. (*nigra* Haw.), *Lithomia solidaginis* Hübn., *Amathes glareosa* Esp. (dark form), *A. agathina* Dup., *Dysstroma truncata* Hufn., *Oporinia filigrammaria* H.-S., *Bombycia viminalis* F., *Celaena haworthii* Curt., *Arenostola pygmina* Haw. (red form), *Amblyptilia punctidactyla* Haw., *Coenocalpe lapidata* Hübn. caught September 1960 and 1961, and three further examples very much larger, bred in 1961. Also shown were some migrants taken in the exhibitor's garden during 1961: two *Herse convolvuli* L., one very small; a female *Utetheisa pulchella* L.; *Nycterosea obstipata* F.; *Palpita unionalis* Hübn.; also an unusual form of *Agrotis clavis* Hufn., and an unusual form of *A. exclamationis* L. taken at Westerham, Kent, 20.vi.61 and 9.vii.61 respectively.

Mr. R. FAIRCLOUGH—(1) Lepidoptera bred during 1961: *Xylomiges conspiciellaris* L., Somerset; *Orthosia advena* Schiff. and *Xanthorhoe quadrifasciata* Clerck, Berks.; *Gypsotea leucographa* Schiff. and *Jodia croceago* Schiff., Surrey; *Apatete euphorbiae* Schiff. and *Thera cognata* Thunb., Inverness-shire; *Stauropus fagi* L. and *Lampropteryx suffumata* Schiff., Sussex; *Scopula promutata* Guen. (*marginipunctata* Goeze auctt. nec Goeze), Portland, Dorset; *Rheumaptera (Calocalpe) undulata* L., Hants.; *Eupithecia expallidata* Doubl. and *E. virgaureata* Doubl., Westmorland; and *Perizoma (Coenoteaphria) sagittata* F., Nottinghamshire, see Fairclough (1960, *Ent. Rec.*, 72: 191) for an account of the discovery. (2) A collection of 42 species of Lepidoptera taken while on holiday on the east Suffolk coast, July and August 1961.

Mr. I. G. FARWELL—*Melitaea cinxia* L. specimens as follows: a typical male upperside, a typical male underside and a typical female upperside; a very suffused male upperside; a white male underside, with hardly any markings; a suffused female upperside which was shown last year, but included again to show continuation of breeding; a slight male aberration; and a female suffused on the forewings. All except the female shown last year were bred, and are the fifth generation which are breeding in the exhibitor's garden at Lymington, Hants, after release.

Mr. BRIAN O. C. GARDINER—(1) A series of photographs and living larvae of Hemileucidae (Saturniinae) bred this year from ova received from Panama through Dr. A. D. Blest. Most of these had not previously been bred. Living larvae shown were final instar *Automeris janus* Cramer, *Dirphiopsis eumedide* Stoll, *Periphoba hircia* Cramer, *Lonomia cynira* Cramer; *P. hircia* from Trinidad were also shown which differ from the ones obtained from Panama and it is suspected may be a different species. Black and white photographs were shown of *A.*

janus, *P. hircia*, *Dirphia avia* Stoll and two unknown larvae from Mexico, believed to be hemileucid species, both of which were also exhibited alive. Colour prints were of *Automeris foucheri* Bouv., *A. junonia* Walker and *A. aurantiaca* Weym. (2) Photographs of *Pieris brassicae* L. ab. *albinensis* Gardiner (1962, *Ent. Gaz.*, **13**: 97), a recessive form bred this year from a continuous brooded stock obtained originally from Cambridge. The majority of specimens fail to get clear of the pupal case, and larval mortality is very high. (3) A plate of unknown origin, circa 1800, illustrating some interesting Irish Lepidoptera from the artist's imagination rather than nature.

Mr. A. E. GARDNER—(1) Thirty-eight species of water beetles (Hydradeephaga) taken at Wood Walton Fen, Huntingdonshire, during 1961. The species represented were: *Haliphus lineatocollis* (Marsh.), *H. ruficollis* (Deg.), *H. immaculatus* Gerh., *H. heydeni* Wehneke, *Noterus clavicornis* (Deg.), *Hyphydrus ovatus* (L.), *Hygrotus inaequalis* (F.), *Oreodytes halensis* (F.), *Hydroporus pictus* (F.), *H. dorsalis* (F.), *H. memnonius* Nicolai, *H. angustatus* Sturm, *H. palustris* (L.), *H. tessellatus* Drap., *H. erythrocephalus* (L.), *H. planus* (F.), *Laccophilus minutus* (L.), *Agabus undulatus* (Schr.), *A. sturmi* (Gyll.), *A. bipustulatus* (L.), *Ilybius fenestratus* (F.), *I. fuliginosus* (F.), *I. ater* (Deg.), *I. quadriguttatus* (Lac.) (*obscurus* (Marsh.)), *Copelatus haemorrhoidalis* (F.), (*agilis* (F.)), *Rantus grapii* (Gyll.), *R. exoletus* (Forst.), *R. pulverosus* (Steph.), *Colymbetes fuscus* (L.), *Dytiscus semisulcatus* Müll., *D. marginalis* L., *D. circumcinctus* Ahrens, *D. circumflexus* F., *D. dimidiatus* Bergs., *Hydaticus transversalis* (Pont.), *H. seminiger* (Deg.), *Acilius sulcatus* (L.) and *Gyrinus natator* (L.). The specimens of *Haliphus heydeni*, *Dytiscus circumflexus* and *Acilius sulcatus* represent new records for the Fen. (2) A series of the rare *Graphoderus cinereus* (L.) and the smooth form of the female *Dytiscus circumflexus* F. from Woolmer, Hants, 2.x.61. The latter is believed to be only the fourth occasion for the smooth form being recorded from Britain. (3) Living examples of the Squeak Beetle *Hygrobia hermanni* (F.) from Woolmer, 2.x.61, *Dytiscus circumflexus* F. from south-west Surrey, 23.x.61, *D. marginalis* L. and *Acilius sulcatus* (L.) from Wood Walton Fen, 15.x.61. See also Mr. J. L. Henderson.

Mr. P. J. GENT—*Selidosema brunnearia* Vill. (*plumaria* Schiff. auctt. nec Schiff.), a large male, heavily marked with the base greyish purple, taken at Swanage, Dorset, 4.viii.59.

Mr. B. GOATER—Lepidoptera as follows: *Utetheisa pulchella* L., male caught flying in sunshine on the sea wall at Lymington, Hants, 19.ix.61 by Mrs. J. Goater. From Findhorn, Morayshire: *Agrotis vestigialis* Hufn., *Euxoa cursoria* Hufn. and *Actebia praecox* L. From Aviemore, Inv.: *Brachionycha nubeculosa* Esp. and a bred series of *Petrova resinella* L. with a hymenopterous parasite. From Hayling Island, Hants: *Leucania favicolor* Barr. with *L. pallens* L. for comparison. From Sawston, Cambs.: *Arenostola fluxa* Hübn., a varied series. From Pagham, Sussex and Ilfracombe, N. Devon: *Cryphia muralis* Forst. From Southwold, Suffolk: *Euxoa cursoria* Hufn. From Mill Hill,

Middx.: a bred series of *Eupithecia pimpinellata* Hübn. From Watford, Herts.: a bred series of *Eupithecia inturbata* Hübn.

Mr. A. L. GOODSON—see Dr. H. B. D. Kettlewell.

Mr. G. M. HAGGETT and Mr. A. J. WIGHTMAN—*Ammogrotis lucerneae* L., two examples from Aviemore, Inv., with two from Sussex for comparison; *Diarsia mendica* F. (*Amathes festiva* Schiff.), a series of small males from Dalwhinnie, Dunf.; *Amathes glareosa* Esp., examples from Aviemore, Isle of Wight, Hants, and Hayle, Corn.; *A. castanea* Esp., colour forms from Inverness-shire; *Eumichtis lichenea* Hübn., pale forms from the Isle of Wight where the females have pale hindwings like the males; *Hadena conspersa* Schiff., examples bred from Aviemore, and Shetland Mainland larvae; *H. caesia* Schiff., a series from the Isle of Man; *Aporophyla australis* Bois., a short series from Hayle; *A. luneburgensis* Freyer., a series from Aviemore, with examples from the Isle of Lewis (Argyll), Arthog (Wales), Hoy (Hebrides), and the Isle of Man for comparison; *A. lunula* Stroem (*nigra* Haw.), from Aviemore and Hayle; *Antitype flavicincta* Schiff., examples from Sussex and Cornwall; *Apamea assimilis* Doubl., a series from Dalwhinnie; *A. crenata* Hufn., extreme form from Dalwhinnie; *Leucania l-album* L., a series from Hayle; *L. vitellina* Hübn., examples taken at Hayle; *Enargia paleacea* Esp., a series from Aviemore; *Tiliacea citrigo* L., examples bred from Inverness-shire larvae; *T. aurago* Schiff., a series showing several colour forms from a single female; *Cirrhia icteritia* Hufn., series from Pulborough, Sussex, bred in various years; *C. gileago* Schiff., series bred in various years from Sussex and Kent larvae, including ab. *palleago* Hübn.; *C. ocellaris* Borkh., a series of forms bred from Suffolk larvae, mostly from the Quibell collection; *Parastichtis suspecta* Hübn., a few examples from Aviemore; *Dryobotodes eremita* F. (*protea* Schiff.), a few examples from Kincaig and Aviemore, Inv.; *Agrochola helvola* L., a series of a small form from Aviemore; and *Utetheisa pulchella* L., an example taken at Arundel, Sussex; *Rhodometra sacraria* L., a short series from Hayle; *Nycterosia obstipata* F., an inbred series of moths reared from an Arundel female; *Eupithecia innotata* Hufn., a long series of broods bred on Sea Buckthorn, Tamarisk and Ash, showing little difference between moths reared on different foodplants or between moths of summer and autumn feeding larvae.

Mr. E. J. HARE.—Lepidoptera as follows: (1) From the Isle of Mull, 20-25.vi.61. Six examples each of *Zygaena loti* Schiff. (*achilleae* Esp.) and *Z. purpuralis* Brün., two examples of *Hepialus fusconebulosa* Deg., and a dull-coloured male *Macrothylacia rubi* L. (2) From south Devon, 9-18.ix.61, seven examples of *Leucania vitellina* Hübn., from a long series, *Luperina dumerilii* Dup., and a pale form of *L. testacea* Schiff., (3) From Pinden, Kent, four examples of *Alispa angustella* Hübn., June 1961, *Gymnoscelis pumilata* Hübn. ab.?, 31.viii.61, *Nycterosia obstipata* F. ab. *obsoleta* Mathew, 25.ix.61, *Aporophyla lutulenta* Schiff., 28.ix.61, grey form, and *Hepialus lupulina* L., a well-marked female, 5.vi.61.

Comdr. G. W. HARPER—(1) Short series of Lepidoptera taken on the coast of north Cornwall and north Devon in June, 1961: *Maculinea arion* L.: very dark *Hadena conspersa* Schiff., with yellow markings; *Hadena barrettii* Doubl.; very fresh *Ammogrotis lucerneae* L., all of which came to mercury vapour light on a single night; and a curious and rare aberration of *Agrotis exclamationis* L. (2) A bred female *Heliothis virescens* Hufn. (*dipsacae* L.) from Wiltshire which exhibited an unusual life-cycle; it was found as a last instar larva feeding on Knapweed blossom, 16.vii.60, and pupated 4.viii.60, it did not begin to form up until mid-August 1961 and emerged on 31st August. (3) A short bred series of *Eupithecia innotata* Hufn. s.sp. *fraxinata* Crewe from larvae found wild on ash in the upper Spey valley, Inverness-shire; *Amathes alpicola* Zett. taken at mercury vapour light, 2.ix.61, which is another record for this species in an odd-numbered year; very fresh specimens of the dark form of *Rhyacia simulans* Hufn. taken at mercury vapour light in September 1961; and several *Rhodometra saccharia* L. taken by day in the Badenoch district of Inverness-shire, where the species was of common occurrence in early September 1961, probably direct immigrants, though possibly offspring of earlier immigration.

Mr. M. W. HARPER—A short series of *Euschesis (Triphaena) sobrina* Boisd., bred from larvae found on young birch (*Betula verrucosa* Ehrh. (*alba* auct.)) in Inverness-shire during May 1961; a series of *Itame brunneata* Thunb. and of *Hydriomena furcata* Thunb., bred from larvae found on Bilberry (*Vaccinium myrtillus* L.) in Inverness-shire during June 1961; the last-named series demonstrates the wide variation of pattern and colour found in the moorland race of this species.

Mr. R. HAYWARD—(1) *Pararge megera* L., an upperside, banded form, from Portsdown, Hants, 19.v.56, and a typical example also from Portsdown, July 1953, for comparison; *Eumenis semele* L., an upperside aberration showing enlarged areas of light markings, Portsdown, 19.viii.58, with a typical example from the New Forest, Hants, 6.vii.59. (2) Aberrations of *Polyommatus icarus* Rott. as follows: an underside with enlarged spots on forewings, Portsmouth, Hants, 7.vi.60; ab. *icarinus* Scharf., 8.vi.57; ab. *arcuata* Courv., Rowlands Castle, Hants, 8.ix.56; and eight underside aberrations from Portsmouth, Portsdown, and Farlington, Hants. A typical example from Ifold, Sussex, was shown for comparison. This small group of minor aberrations of the Common Blue butterfly is the total reward for ten years searching for aberrations of this species. (3) Moths taken during 1961, except for those otherwise indicated: *Utetheisa pulchella* L., Swanage, Dorset, 29th September; *Arctia caja* L., yellow form, Tresco, Scilly Isles, 14th June, with a typical example from Portsmouth, Hants, 7.vii.60; *Heliothis armigera* Hübn., Swanage, 29th September; *Leucania unipuncta* Haw., Swanage, 23rd September; *L. vitellina* Hübn., Tresco, 14th and 20th June, Swanage, 28th September, and Northwood, Middx., 4th October; *Lithophane leautieri* Boisd., Swanage, one on 23rd and three on 28th September; *Catocala nupta* L., an aberration with red on

the hindwings replaced by dark brown, Northwood, 29th August, and a typical example from Portsmouth, 3.viii.58; *Sterrhia biselata* Hufn., an aberration suffused with grey, Purbrook, Hants, July, and a typical example from the New Forest, 8th July; *Rhodometra sacraria* L., Swanage, 23rd September.

Mr. J. L. HENDERSON and Mr. A. E. GARDNER—A short series of *Chaetocnema aerea* Letzn., a beetle new to Britain, taken at Bookham, Surrey this year. Also six other British species of the genus; *C. subcoerulea* Kuts., *C. confusa* Boh., *C. hortensis* (Geof.), *C. sahlbergi* (Gyll.), *C. arida* Foud., and *C. concinna* (Marsh.).

Mrs. E. A. HESLOP—The following two aberrations of *Apatura iris* L. (Purple Emperor) both taken wild in Wiltshire. (1) Male upperside ab. *romaniszyni* Schille, taken by Jane Heslop, 29.vii.55 (2) Upperside ab. *sari* Heslop, co-type (see 1961, *Ent. Rec.*, 73: 58), male, taken by John Heslop, 30.vii.57 (Pl. II, fig. 1.).

Mr. I. R. P. HESLOP—The following Lepidoptera taken wild by the exhibitor. (1) A series of the little-known, and now very scarce and local, western race of *Mellicta athalia* Rott. (Heath Fritillary), south Cornwall, 3.vi.61. The species was very numerous in the locality, which unfortunately, is now doomed. (2) The type of the male underside ab. *sorbioduni* Heslop of *Apatura iris* L. (Purple Emperor), Wiltshire, 25.vii.60 (1961, *Ent. Rec.*, 73: 59); the upperside is full ab. *jole* Schiff., but the underside is very different both from the usual *jole* Schiff. and from *forma typica* (Pl. II, fig. 2.).

HOPE DEPARTMENT, UNIVERSITY MUSEUM, OXFORD—see Professor G. C. Varley.

Mr. T. J. G. HOMER—Examples of *Alcis repandata* L., the Mottled Beauty.

Mr. T. J. HONEYBOURNE—A pair of *Actias selene* Hübn. (Indian Moon Moth); full grown larvae of *Antheraea pernyi* Guér. (Japanese Oak Silk Moth); and a pair of *Epantheria deflorata* F. (Mexican Leopard) with their larvae.

Mr. and Mrs. T. G. HOWARTH—A female *Apatura iris* L. bred *ab ovo* from a female captured by A. S. Wheeler. The following Heterocera all taken in a mercury vapour trap at Arkley, Herts.: *Euschesis comes* Hübn. ab. *grisea* Tutt; *Agrotis segetum* Schiff., an aberration having dark termen to forewing; *Amathes xanthographa* Schiff., an aberration having dark grey termen to forewing; *Agrochola lychnidis* Schiff., a somatic mosaic male having darker wings on the left side than on the right; *Conistra vaccinii* L., a somatic mosaic male having slightly darker wings on the right side than on the left, it was the only specimen seen in 1961, being taken on 21st January; *Aporophylla lutulenta* Schiff., the first recorded specimen from Arkley; *Rhodometra sacraria* L., a male taken 31.viii.61, one of the first recorded this year; a male *Erannis defoliaria* Clerck, taken 29.ix.61, an exceptionally early date; *Diasemia ramburialis* Dup., a male taken on 22.ix.61.

Mr. G. E. HYDE—Twelve coloured slides of Lepidoptera.

Capt. R. A. JACKSON—Two specimens of *Coenonympha pamphilus* (L.), a male with normal left wings, but with those on the right very thinly scaled, and almost white; and a female with all the wings a very pale straw colour. On the wing the male looked quite white. Both insects came from the downs near Warminster, Wilts.

Mr. S. N. A. JACOBS—A small general collection of microlepidoptera collected mainly in the Valais Canton of Switzerland during July 1961.

Mr. R. A. JARMAN—(1) A series of *Acherontia atropos* L., together with empty pupa cases and blown larvae, collected in the late autumn of 1960 in Berkshire and reared in home made, heat controlled cage at a constant temperature of 87°F. (30.5°C.). These were accompanied by photographs of the moth emerging in the early hours of the morning. One of the moths shown was a melanic form, apparently undescribed. (2) Two fine aberrations: *Melicta athalia* Rott., which closely resembled *ab. eos* Haworth, and *Melitaea cinxia* L. Both specimens were extreme on both the upperside and the underside.

Major F. L. JOHNSON—A selection of gynandromorph butterflies from Formosa which included some mosaics and covered six genera and seven species. Also four species of Ornithoptera (Bird Wing butterflies) from New Guinea and Palawan. Some of the species were shown in 1958 (1959, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1958: 47) and some others in 1959 (1960, *ibid.*, 1959: 2).

Major General Sir GEORGE JOHNSON—Short series of 30 species of Continental butterflies representative of the Engadine and neighbouring parts of Switzerland from elevations between 3,000 and 7,000 feet.

Mr. C. JOHNSON—(1) A selection of Coleoptera taken during 1961. CARABIDAE: *Cicindela sylvatica* L., Studland Heath, Dorset; *Carabus arvensis* Herbst s.sp. *sylvaticus* Dej., Hoo Moor, Derbyshire; *C. glabratus* Payk. *ab. lapponicus* Börn. Glen Affric, Inv., *C. granulatus* L., Delamere, Cheshire; *Nebria salina* Fairm. (*degenerata* Schaufuss), Rothiemurchus, Inv., *Clivina collaris* (Herbst), Etherow Valley, Cheshire; *Miscodera arctica* (Payk.), Hollingworthall Moor, Cheshire and Clachaig, Inv.; *Asaphidion pallipes* (Dufts.), River Nethy, Inv.; *Licinus punctulatus* (F.) (*silphoides* (F.) nec (Rossi)), Chesil, Dorset; *Harpalus (Ophonus) puncticollis* (Payk.), Chesil; *Pterostichus lepidus* (Leske), Clachaig; *P. cupreus* (L.), Bucknell, Oxfordshire; *P. vernalis* (Panz.), Mobberley, Cheshire; *P. oblongopunctatus* (F.), Duack Burn, Inv.; *Stomis pumicatus* (Panz.), Dukinfield, Cheshire; *Anisodactylus binotatus* (F.), Morley Moss, Cheshire; *Calathus micropterus* (Dufts.) Duack Burn; *C. ambiguus* (Payk.), Chesil; *Cymindis vaporariorum* (L.) Clachaig; *Masoreus wetterhali* (Gyll.), Chesil. SILPHIDAE: *Xylodrepa quadripunctata* (L.), Ogden Valley, Lancs.; *Ablattaria laevigata* (F.), Chesil. HISTERIDAE: *Onthophilus striatus* (Forst.), Lyndhurst, Hants.; *Plegaderus dissectus* Er., Lyndhurst; *Carcinops quattuordecimstriatus* (Steph.), Niton, Isle of Wight. LYCIDAE: *Dictyopterus affinis* (Payk.), Duack Burn. CANTHARIDAE: *Cantharis paludosa* Fall., Culbin, Morayshire. DASYTIDAE: *Psilothrix cyaneus* (Ol.), Chesil. CLERIDAE: *Tillus elongatus*

(L.), Wood Crates, New Forest, Hants. OSTOMATIDAE: *Thymalus limbatus* (F.), Matley, New Forest and Duack Burn. NITIDULIDAE: *Soronia punctatissima* (Ill.), Denny Wood, New Forest; *Pityophagus ferrugineus* (L.), Glen Affric, and Rannoch, Perthshire; *Glischrochilus quadripunctatus* (L.) (*quadripustulatus* (L.)), Rannoch. EROTYLIDAE: *Biphyllus lunatus* (F.), Water Eaton, Oxfordshire. MYCETOPHAGIDAE: *Mycetophagus piceus* (F.), Bollin Valley, Cheshire. COCCINELLIDAE: *Coccidula scutellata* (Herbst), Hatchmere, Cheshire. ELATERIDAE: *Hypnoidus dermestoides* (Herbst), Etherow Valley; *Ctenicera (Corymbites) pectinicornis* (L.), Etherow Valley, *Athous villosus* (Geof.), Matley, New Forest. ANOBIIDAE: *Xestobium rufovillosum* (Deg.), Water Eaton; *Hedobia imperialis* (L.), *Ochina ptnoides* (Marsh.) and *Grynobius excaratus* (Kug.), Moccas, Herefordshire. OEDEMERIDAE: *Ischnomera caerulea* (L.), Moccas. MORDELLIDAE: *Tomoxia biguttata* (Gyll.), Matley New Forest; *Mordellistena abdominalis* (F.), Bucknell, Oxfordshire. MELANDRYIDAE: *Tetratoma fungorum* F., Broadbottom, Cheshire; *T. anchora* F., River Nethy; *Hallomenus binotatus* (Quens.), river Nethy; *Orchesia undulata* Kraatz, Wood Crates, New Forest; *Abdera flexuosa* (Payk.), River Nethy; *A. triguttata* (Gyll.), Duack Burn; *Phloiотrya rufipes* (Gyll.), Wood Crates, New Forest. ALLECULIDAE: *Prionychus ater* (F.), Denny Wood, New Forest. TENEBRIONIDAE: *Eledona agricola* (Herbst), Knightwood, New Forest; *Boletophagus reticulatus* (L.), Glen Affric. SCARABAEIDAE: *Typhaeus typhoeus* (L.), *Aphodius tenellus* Say., *A. lapponum* Gyll., and *A. depressus* (Kug.), Glossop, north Derbyshire; *A. distinctus* (Müll.) *A. granarius* (L.) and *A. plagiatus* (L.), Ainsdale, Lanes.; *A. tristis* Zenker, Lyndhurst, Hants.; *A. borealis* Gyll. and *A. equestris* (Panz.), Moccas; *A. constans* Duft., Water Eaton; *A. nemoralis* Er., River Nethy; *Aegialia sabuleti* (Panz.), Clachaig; *Oxyomus sylvestris* (Scop.), Ainsdale; *Hoplia philanthus* (Fuess.), Lyndhurst and Knightwood; *Trichius fasciatus* (L.), Culbin Forest and Darnaway Forest, Morayshire; *Serica brunnea* (L.), Freshfield, Lanes. and Clachaig. CERAMBYCIDAE: *Leptura scutellata* F., Wood Crates, New Forest; *L. sanguinolenta* L., Duack Burn; *Strangalia quadrifasciata* L., Culbin and Glen Affric; *Pogonochaerus hispidus* (L.), *P. hispidulus* (Pill. & Mitt.), *Anaglyptus mysticus* (L.), and *Pyrrhidium sanguineum* (L.), Moccas; *Phymatodes testaceus* (L.), Lymington, Hants.; *Tetrops praeusta* (L.), Whixall Moss, Shropshire and Witherslack, Westmor. CHRYSOMELIDAE: *Donacia semicuprea* Panz., Hyde, Cheshire; *D. marginata* Hoppe, Lyndhurst; *Cryptocephalus aureolus* Suff., Wood Fidle, New Forest, *C. pusillus* F., Freshfield, *C. parvulus* Müll., Whixall Moss; *Chrysomela (Melasoma) aenea* L., River Nethy; *Chrysolina (Chrysomela) fastuosa* (Scop.), Carrington Moss, Ches. CURCULIONIDAE: *Otiorrhynchus atroapterus* (Deg.), Studland, Dorset; *O. arcticus* (F.) v. *blandus* Gyll., River Nethy; *Rhinocyllus conicus* Fröl., Chesil; *Cionus tuberculosus* (Scop.), Matley, New Forest; *Polydrusus mollis* Stroem., Witherslack; *Caenorhinus (Rhynchites) interpunctatus* (Steph.), Pettypool, Cheshire; *Eremotes ater* (L.), Glen

Affric; *Pentarthrum huttoni* Woll., Denny Wood; *Magdalis carbonaria* (L.), Witherslack; *M. armigera* (Geof.), Bucknell; *Pissodes pini* (L.), Rothiemurchus and Rannoch; *Hylobius abietis* (L.), Rannoch; *Curculio* (s. gen. *Balaninus glandium* (Marsh.)), Moccas. PLATYPODIDAE: *Platypus cylindrus* (F.), Moccas. SCOLYTIDAE: *Hylastes brunneus* Er., Rannoch. (2) Coleoptera bred: CUCUJIDAE: *Dendrophagus crenatus* (Payk.) from larvae, River Nethy. DERMESTIDAE: *Ctesias serra* (F.), from pupae, Pettypool. CERAMBYCIDAE: *Leiopus nebulosus* (L.), from larvae and pupae, Delamere and Pettypool; *Arhopalus (Criocephalus) rusticus* (L.), from pupae, Duack Burn; *Acanthocinus aedilis* (L.), from pupae, Glen Affric; *Rhagium inquisitor* (L.), from larvae, Glen Affric. PYTHIDAE: *Pytho depressus* (L.) from larvae, Glen Affric. MELANDREYIDAE: *Xylita laevigata* (Hellen.), from pupa, Glen Affric. (3) Diptera (Tabanidae): *Tabanus verralli* Oldroyd, Knightwood, New Forest; *T. bisignatus* Jaennike, Lyndhurst; *T. bromius* L., *T. fulvus* Meig., *T. maculicornis* Zell. and *T. distinguendus* Verrall, Matley, New Forest.

Dr. H. B. D. KETTLEWELL and Mr. C. J. CADBURY—A selection of Shetland Lepidoptera taken in August and September 1959, 1960 and 1961, with special reference to non-industrial melanism. During these three years we and five others of our team have carried out an extensive experimental programme on the problem of the occurrence of non-industrial melanism among Shetland Lepidoptera (one third of the indigenous macros have melanic forms). Much of the experimental work was based on a study of *Amathes glareosa* Esp. A series of this species was exhibited showing *forma typica* (the majority of which are darker than English specimens) and the melanic f. *edda* Staud., both the homozygous and the usually recognizably lighter heterozygous forms. (The inheritance of f. *edda*, which is controlled by a single dominant gene, was established 1960-61 (*Heredity*, December 1961)). A frequency map was also exhibited showing the distribution of *forma typica* and f. *edda* throughout the Shetland archipelago. This map, built up on over 27,000 captures, showed a north-south cline in the frequency of f. *edda* in the *glareosa* population with the melanic at 97 per cent on Unst, and as low as 2 per cent in Dunrossness, 60 miles to the south. The cline is somewhat interrupted by one or more geographical barriers in the vicinity of Tingwall, a broad agricultural valley, and not at the two water barriers as might be expected. Series of certain other Shetland species were also displayed with local melanic forms: *Euxoa cursoria* Hufn., including an extreme blackish specimen; *Lycophotia varia* Vill.; *Ammogrotis lucerneae* L.; *Amathes xanthographa* Schiff., 97 per cent melanic throughout Shetland; *Diarsia mendica* F. (*festiva* Schiff.) s.sp. *thulei* Staud., ranging from dark chestnut-brown specimens to those that were ashen-grey and sooty-black; *Hadena conspersa* Schiff.; *Apamea monoglypha* Hufn., 0.5 per cent of a sample of 1,500 were black; *Dasypolia templi* Thunb. with both dark purplish and light buffish specimens; *Lygris populata* L., 18 per cent melanic, 67 per cent intermediate in sample of 94; the later hatching *L. testata* L., a very small proportion of Shetland population dark; *Xanthorhoe*

fluctuata L.; *Colostygia didymata* L.; and *Hydriomena furcata* Thunb., both green and blackish specimens. Also included among the Shetland melanics were a fine series of *Apamea exulis* Lef. from north-west Shetland where this species was found to be common at sea level. Over 95 per cent of a sample of 150 were melanic, contrasting with the low proportion of melanics among the *exulis* taken by other entomologists at 300 feet and above on Unst. Local Shetland forms included *Paradrina claripalpis* Scop. with red orbicular and reniform cells outlined in white; the reddish f. *pythonissata* Millière of *Dysstroma citrata* L.; the ochreous form of *Xanthorhoe munitata* Hübn., which shows surprisingly little variation throughout Shetland, and the remarkable *X. montanata* Schiff., f. *shetlandica* Weir with pale washed-out central band and heavy marginal banding to the forewings. *Eurois occulta* L., represented by two dark grey and two light grey specimens was shown, and two aberrations of *Cerapteryx graminis* L., one pale buff and the other with light central area of the forewings, were also included. Single specimens of two scarce Shetland species *Eumichtis adusta* Esp. and *Rhizedra lutosa* Hübn., both from Hillswick, North Mainland. A male *Parasemia plantaginis* L., reared from a larva taken on peat hags, Wodbister Voe, South Mainland, may be the first Shetland record this century. Specimens of four species previously unrecorded in Shetland were exhibited: one *Diarsia rubi* View.; two *Apamea crenata* Hufn.; *Heliothis armigera* Hübn., one taken at light at Hillswick, North Mainland 6.ix.61; a number of *Plusia festucae* L., which is almost certainly breeding in Shetland; and *P. interrogationis* L., one 1.viii.59 and ten 13-17.viii.61. The 1959 insect was probably a migrant from northern Europe. In connection with this it is worth drawing further attention to the *P. interrogationis* taken by H. C. Huggins in Essex, 2.viii.59, and H. A. Kennard's record of a migration of this *Plusia* in southern Denmark early in the same month of that year (see *Proc. S. Lond. ent. nat. Hist. Soc.*, 1959: 18).

Dr. H. B. D. KETTLEWELL and Mr. A. L. GOODSON—Lepidoptera of special interest from the Rothschild-Cockayne-Kettlewell collection. *Pelosia obtusa* H.-S. with *P. muscerda* Hufn. for comparison. The former is new to Britain and was netted at Barton Broad, Norfolk, 31.vii.61. Its range in Europe, so far as is known, is Italy, N. Germany, Denmark, and more recently Holland. Early stages are not known except that a pupa is said to have been found in Germany in a reed. The specimen ignored the mercury vapour lamp which was within ten yards and was netted on the wing. (A. L. Goodson). *Malacosma neustria* L. ab. *ochracea-unicolor* Tutt., yellow form with no markings, Tring, Herts., 25.vii.61 (A. L. Goodson). *Gymnoscelis pumilata* Hübn. ab. *tenebrata* Dietze, a strong melanic form, Chobham, Surrey, bred 1.vii.61 (A. L. Goodson). *Pelosia muscerda* Hufn. ab. *immaculata* Oudemans, without the usual spots on the forewings, Barton Broad, Norfolk, 2.viii.61 (A. L. Goodson). *Deilinia (Cabera) exanthemata* Scop. ab. *crassesignata* Lempke, with the transverse lines of all wings heavy, Ham Street, Kent, 15.vi.61 (A. L. Goodson). *Xanthorhoe spadicearia*

Schiff., a melanic ab. nov., Tring, 30.v.61 (A. L. Goodson). *Lyncometra ocellata* L., three extreme bandless forms, more extreme than ab. *costimacula* Cockayne, shown with one typical example from the same brood, Ham Street, bred 27-28.vii.61 (A. L. Goodson). *Perizoma albulata* Schiff. ab. nov. with median band represented only by a thin line, St. Annes-on-Sea, Lanes., bred 17.vi.61 (A. L. Goodson). *Cerastis rubricosa* Schiff. ab. *pallida* Tutt with pale pink ground, Tring, 16.iii.61 (A. L. Goodson). *Utetheisa pulchella* L., Skerries, N.W. Anglesey, 21.ix.61 (P. Hope-Jones), and another W. Hythe, Kent, 10.x.61 (Kettlewell and Cadbury). *Amathes c-nigrum* L. ab. nov. with black costal markings completely absent on right forewing, Tring, 8.ix.61 (A. L. Goodson), and another ab. nov. with black costal markings reduced to small spots, Steeple Barton, Oxon., 17.ix.61 (H. B. D. Kettlewell). *Allophyes oxyacanthae* L. ab. *capucina* Mill., extreme black form, Steeple Barton, 10.x.61 (H. B. D. Kettlewell).

Mr. J. E. KNIGHT—Ten 35mm. transparencies depicting: larvae of *Smerinthus ocellata* L., *Malacosoma neustria* L., *Phalera bucephala* L., *Bomolocha crassalis* F., *Amphipyra pyramidea* L., *Lygris testata* L., *Anagoga pulveraria* L.; and the imago, larva and cocoon of *Apatele menyanthidis* View.

Mr. R. P. and Mr. S. A. KNILL-JONES—Lepidoptera taken in a mercury vapour light trap unless otherwise stated. *Harpyia bicuspis* Borkh., at light, Malvern, Wores., 13.v.61; *Apatele alni* L., Malvern, 13.v.61; *Agrotis segetum* Schiff., a small male measuring 32 mm. across the wing-tips, Malvern, 28.v.61; *Leucania vitellina* Hübn., five examples from a series of 12 taken at Freshwater, I.o.W., between August and October 1961; *Lithophane leautieri* Boisd., two preserved larvae and a short series of imagines, including one small specimen, wingtip measurements 29 m.m., bred from ova from females taken at Freshwater; *Eumichtis lichenea* Hübn., Freshwater, 30.ix.61; *Antitype xanthomista* Hübn. s.sp. *statice* Grgs., six taken at Nolton Haven, Pemb., 2 to 12.ix.61; *Cirrhia gilvago* Schiff., showing variation, Keswick, Cumb., 12.ix.59, Bowdley, Wores., 12.ix.60 and Freshwater, 21 and 23.ix.61; *Luperina testacea* Schiff., a series showing variation, from Freshwater, I.o.W., Barton-on-Sea, Hants, and Nolton Haven, Pemb., including a specimen showing unilateral variation—with the right side normal and the left forewing having a smudged appearance, the inner and outer lines and the shade between them absent, being replaced by the fulvous ground colour, Nolton Haven, 5.ix.61; *Luperina dumerillii* Dup., two males taken at Freshwater, the first records for the Isle of Wight, including a typical example on 16.ix.61, and a pale form approaching ab. *desyllesi* Boisd., 18.ix.61; *Stilbia anomala* Haw., Nolton Haven, 2.ix.61; *Celaena haworthii* Curt., female, Nolton Haven, 2.ix.61; *Plusia orichalcea* F., the first record for the Isle of Wight, Freshwater, 20.ix.61; *Lithosia complana* L., a single example, Freshwater, 20.viii.58, and three from a series of 20 taken at Malvern during July 1961; *Cosymbia porata* L., six specimens and a preserved larva, bred from a female taken at Malvern, 1960; *Rhodometra sacraria* L., four males, Nolton Haven, 1-3.ix.61,

one male and one female ab. *aucta* Krausse, Freshwater, 4 and 6.x.61; *Lobophora halterata* Hufn., Malvern, 20.v.61; *Bapta bimaculata* F., found at rest, Freshwater, 17.iv.61; *Semiothisa liturata* Clerck, two typical examples, Malvern, 8 and 10.vii.61, and three females ab. *nigrofulvata* Collins, showing variation in the strength of the orange line, and a preserved larva, all bred from a female of the same aberration taken at Malvern, 1960; *Aphomia sociella* L., a series of seven taken at Malvern, May to July 1961; *Hypochalcia ahenella* Schiff., an unusual aberration in which the cross lines are absent, leaving the forewings a uniform reddish-fawn, Malvern, 9.v.61; and *Diasemia ramburialis* Dup., Freshwater, 24.ix.61.

Dr. J. R. LANGMAID—The following Lepidoptera: *Herse convolvuli* L., Plymouth, Devon, 11.ix.61; *Utetheisa pulchella* L., Swanage, Dorset, 29.ix.61; five aberrant examples of *Agrotis exclamationis* L., taken in Hampshire, May to July 1957-58; *Lithophane leautieri* Boisd., a series of four specimens taken at Swanage, 25-29.ix.61; *Leucania unipuncta* Haw., Plymouth, 13.ix.61; *L. vitellina* Hübn., three specimens taken at Copthorne, Sussex, 6.ix.61, Plymouth, 11.ix.61 and Swanage, 27.ix.61; *Heliothis armigera* Hübn., Swanage, 29.ix.61; *Chiasmia clathrata* L., aberration, Droxford, Hants, 31.v.58; *Eupithecia phoeniceata* Ramb., Swanage, 23.ix.61; and *Phigalia pilosaria* Schiff. (*pedaria* F.), aberration, Droxford, 24.ii.59. (2) A watercolour painting by Mrs. Shirley East, together with the original specimen (previously exhibited in 1955), of *Leucania unipuncta* Haw. ab. *nigrosuffusa* Richardson. The moth was taken at Southsea, Hants, 28.ix.54. (see Pl. II, fig. 5.).

Mr. M. J. LEECH—(1) Insects from the Nature Conservancy's Reserves at Wood Walton and Holme fens, and from Castor Hanglands, Northants., taken during 1961: *Mimas tiliae* L., a short series of *Stauropus fagi* L., a series of *Leucania pudorina* Schiff., and *Lygephila pastinum* Treits., *Eilema griseola* Hübn., *E. complana* L., *Sterrhia emarginata* L., *Leucania obsoleta* Hübn., *Zanclognatha cribrumalis* Hübn., *Laspeyria flexula* Schiff., *Anticollix sparsata* Treits., *Scopula immutata* L., *Sterrhia subsericeata* Haw., *Horisme tersata* Schiff., an example of *Lyncometra ocellata* L., with the central band very much reduced, and with a typical example for comparison; a bred, and a feral, specimen of *Perizoma sagittata* F., a specimen of *Lycia hirtaria* Clerck, taken at mercury vapour light at Holm Fen, 10.vi.61, an unusually late date. (2) from Aviemore, Inv., short series of the following: *Eumichtis adusta* Esp., *Hadena bombycina* Hufn., *Apatete menyanthidis* View., *Spilosoma lubricipeda* L., *Isturgia carbonaria* Clerck, *Ortholita mucronata* Scop., s.sp. *scotica* Cockayne, *Anarta melanopa* Thunb., a bred series of *Thera cognata* Thunb., *T. firmata* Hübn., *T. obeliscata* Hübn., *Crocallis elingvaria* L., specimens of *Apatete euphorbiae* Schiff., s. sp. *myricae* Guen., *Anarta cordigera* Thunb., *Dyscia fagaria* Thunb., *Electrophars corylata* Thunb. (3) from Ben Lawers and Rannoch districts of Perthshire: series of *Erebia epiphron* Knoch, *Amathes ditrapezium* Schiff., *Rheumaptera subhastata* Nolek., *Colostygia salicata* Hübn., *Epirrhoe tristata* L., *Ortholita plumbaria* F., *Cleorodes*

lichenaria Hufn., *Cocconympha tullia* Müll. (4) from Salcey Forest, Northants.: a series of *Leptidea sinapis* L., and a bred series of *Malaecosoma neustria* L. (5) from Cannock Chase, Staffs.: two specimens of *Harpyia bicuspis* Borkh., taken at mercury vapour light, 11.v.61. (6) Insects taken or bred in Leicestershire, all taken within a 20-mile radius of the city centre. Bred series of *Dysstroma truncata* Hufn.; a case showing examples of the F₁, F₂ and F₃ generations of *Selenia bilunaria* Esp.; short series of *Tethea ocularis* L., *Orthosia populeti* F., *Meristis trigrammica* Hufn., *Apatele alni* L., *Selenia lunaria* Schiff., *Atethmia xerampelina* Esp., *Trichiura crataegi* L.; a specimen of *Herse convolvuli* L.; and two new county records, *Rhodometra sacra* L. and *Nycterosia obstipata* F., both taken at mercury vapour light at Countesthorpe, on the nights of 1 and 2.ix.61. (7) a series of 35 mm. colour transparencies of insects.

Major General C. G. LIPSCOMB—Extreme temperature aberrations of *Aglaia urticae* L., *Nymphalis io* L. and *Vanessa atalanta* L. bred during the last three years. Those of *A. urticae* and *N. io* were produced by submitting the pupae to temperatures below 32° F. for periods of up to three days. Those of *V. atalanta* by artificially delaying emergence for seven or eight weeks.

Lt.-Col. and Mrs. W. B. L. MANLEY—A series of 16 species of Zygaenidae taken in Italy, France and England during 1961. Various races and forms were shown, making a total of over 500 insects. The more interesting species included *Mesembrynus cynarae* Esp., *M. erythrus* Hübn., *Agrumenia hilaris* Ochs., *Zygacna oxytropis* Boisd. and *Z. dalmatina* Boisd. All determinations are by Mr. W. G. Tremewan (Dept. of Entomology, British Museum, Nat. Hist.).

Mr. G. H. MANSELL—A series of *Polygonia c-album* L., and two *Mesoacidalia charlotta* Haw. (*Argynnis aglaia* L.).

Capt. D. G. MARSH—The following Lepidoptera: *Plusia gamma* L., a male, 29.vii.61; and a female, 18.vii.61, both without a tail to the 'Y', taken at Ickham, Kent; *P. festucae* L., two *Diarsia rubi* View. and a fine female *Polyommatus icarus* Rott., all taken at Lochinver, Sutherland, July 1961; *Leucania vitellina* Hübn., a male taken at Ickham, 29.viii.61; *Cucullia absinthii* L., a male taken at Ickham, 29.vii.61; *Phlogophora meticulosa* L. a red suffused form taken at Ickham, 26.ix.61; a short bred series of *Cosymbia linearia* Hübn. from Thornden Woods, Kent, 1961; *Cosmia trapezina* L. ab. *rufa* Tutt, Ickham, 29.vii.61; *Anaplectoides prasina* Schiff., Ickham, 6.vi.61; a female *Eublemma ostrina* Hübn., taken in a mercury vapour light trap at Ickham, 16.ix.61; two male *Nycterosia* (*Nyctosia*) *obstipata* F., Ickham, 29.viii.61 and 16.ix.61; *Drepana curvatula* Borkh., two females and a male bred by the exhibitor from a female taken in a mercury vapour light trap at Dover, Kent, by George Youden, 13.viii.60; *Dioryctria formosa* Haw., Ickham, 30.vii.61; and *Euxanthia alternana* Steph., Ickham, 30.vii.61.

Dr. A. M. MASSEE—(1) A species of mirid bug new to science, which has been named *Globiceps woodroffeii* Wagner after the well-known

British hemipterist, Mr. G. E. Woodroffe. This species has been recorded from Blackdown, Sussex, and Witley Common, Surrey. It is associated with heath and heather growing among scots pine and birch. (2) Representatives of the stilt bugs (Berytinidae). Forty species are recorded in Europe, of these 13 occur in the British Isles. Some species are very local and rare, e.g., *Berytinus hirticornis* (Bruellé) is confined to Devon and Cornwall; while *Cymus obliquus* Horvath occurs only in a few localities in Kent, Surrey, Berks., and Sussex. The large and handsome bug *Metatropis rufescens* (H.-S.) is associated with Enchanter's Nightshade. (3) A signed copy of *British Entomology*, Hemiptera, by John Curtis, F.L.S., formerly belonging to the celebrated hemipterist J. W. Douglas. (4) Volume I of *The British Hemiptera* by J. W. Douglas and J. Scott. The plates illustrating the genera were executed by E. W. Robinson, and represent some of the finest engravings ever depicted of British Hemiptera.

Miss C. A. McDERMOTT—*Ocnonympha tullia* Müll., bred from a female caught at Betty Hill, Sutherland, 22.vi.60. Eggs were laid 23.vi.60 and hatched 7.vii.60. The larvae pupated 12.vii.61 and imagines emerged 27.vii.61.

Mr. ROBIN MERE—(1) *Amathes glareosa* Esp., 18 specimens bred as F₁ generation from a Shetland female, ova were kindly given by Dr. Kettlewell. These comprised two specimens of typical though rather dark colouring, and 16 ab. *edda* Staud., some more extreme than others. It is thought that both parents were heterozygotes, and that the F₁ generation represented a 1:2:1 ratio of typical, normal dark heterozygote ab. *edda*, and very dark homozygote ab. *edda*. There were gradations in the colouring of the ab. *edda* specimens, and it was a matter of opinion how many were heterozygotes and how many were homozygotes. Additional to those shown, one typical form had been bred but had escaped. Some typical examples from Cornwall were also shown. (2) Lepidoptera of interest as follows: *Cyenia mendica* Clerck, a varied series of Irish males, with English males for comparison; *Epinotia* (*Eucosma*) *nemorivaga* Tengst., a short series from the Burren, Co. Clare, new to the Irish list; *Olethreutes* (*Argyroplece*) *arbutella* L., also from the Burren, and new to the Irish list; *Zelleria saxifragae* Staint., a series bred from larvae mining *Saxifraga hirsuta* L., *S. spathularis* Brot. and *S. hirsuta* × *spathularis* hybrid in Co. Kerry at a height of some 1,000 feet, new to the Irish list, previously known from the highlands of Perthshire and Aberdeenshire but not elsewhere in the British Isles; *Hypercallia christiernana* L. (*citrinalis* Scop.), a short series bred from larvae on *Polygala* spp. from the Burren; *Pyrausta funebris* Stroem., a short series from the Burren, and from Surrey, the Irish examples have larger white spots and a small extra spot on the forewing; *Drepana harpagula* Esp., two examples taken at mercury vapour light in June 1961, from a new locality not in Somerset; *Amathes castanea* Esp., some very dark specimens of the red form from Aviemore, Inv.

Mr. J. L. MESSENGER—Lepidoptera from North Wales, including

examples of *Ammogrotis luccerna* L. and *Sterrhia eburnata* Wocke; and a short series of *Amathes ashworthii* Doubl., taken in June 1961. Lepidoptera from the Isle of Mull showing examples of the buff form of *Spilosoma lubricipeda* L., with series of *Zygæna loti* Schiff. (*achilleae* Esp.), and *Z. purpuralis* Brün. A melanic example of *Drymonia dodonaea* Schiff. (*trimacula* Esp.) from east Kent, on which the only conspicuous marking is an irregular white line representing the second line; a specimen of *Heliothis armigera* Hübn., taken 10.x.61, at Witley, Surrey; with specimens of *Leucania unipuncta* Haw. and *L. vitellina* Hübn. from south Devon, the last named also from Surrey. (see Pl. II, fig. 6).

Mr. H. N. MICHAELIS — Lepidoptera including: *Pterophorus* (*Alucita*) *spilodactyla* Curtis, North Wales; *Grapholita internana* Guen., North Wales and Cheshire, new to Cheshire; *G. tenebrosana* Dup., Formby, Lancs., and Spurn, Yorks., bred, scarce in both areas; *Elachista poae* Staint., Cheshire and Lancashire, not previously recorded from either county; *Epinotia pygmaeana* Hübn., Macclesfield, Cheshire, scarce in the county; *E. maculana* F., Aviemore, Inverness-shire; *Plebejus argus* L., Llandudno, North Wales.

Mr. W. E. MINNION—Twelve slides of natural history subjects as follows *Perizoma sagittata* L., the larva of *Saturnia pavonia* L., *Hyloicus pinastri* L., *Apatole leporina* L., sea urchin shells, the Edible Frog, a young hedgehog, a Meadow Pipit's nest, a Blackbird's nest, a Bank Vole, *Cepaea* (*Helix*) *nemoralis* L. on lichen, and bracket fungi.

Mr. A. M. MORLEY—(1) Lepidoptera from Folkestone, Kent, except where otherwise stated: *Polygonia c-album* L., a male the colour of *P. egea* Cramer and with dark markings reduced enough to alter its appearance, also a female similar form, set to show underside, from Ham Street, Kent, 6.vii.43; *Lymantria dispar* L., a battered male, 30.viii.61; *Artica caja* L. ab. *confluens* Rebel, 24.viii.60; *Phyludoria potatoria* L., two males differing in colour, 2 and 9.viii.58; two examples from a series of *Phlogophora meticulosa* L., bred from a female taken 26.x.60, all of which were dark and, like their parent, greener than the common English form (ab. *pallida* Tutt), when they faded it was the green, not the pink as Barrett says, that remained; *Hepialus sylvina* L., a dwarf male, 27.viii.60; *Amathes c-nigrum* L., a male with the costal triangle prolonged to the base of the wing, 31.viii.60, and another male suffused with brown, 9.ix.61; *Agrotis puta* Hübn., ab. *nigra* Tutt, 28.vii.61; a worn female *A. exclamantis* L., with rather curious markings, 10.vii.60, and another female with traces of a broad central band, 16.vi.60; a male *Allophyes oxyacanthæ* L., very close to ab. *capucina* Mill., 12.x.61; a male *Eumichtis lichenea* Hübn. as dark as the females are in the Folkestone area and as dark as specimens from the north-west, 2.x.61, and a typical example from the Folkestone area; a small reddish *Plusia gamma* L., 15.vii.58, and a dark brown, melanic, male, to which the exhibitor can find no reference, 24.x.60; a male *Aleis repandata* L., darker brown than is usual in the Folkestone area, where grey specimens are in a small minority, 5.vii.58, a male ab., *conversaria* Hübn., 2.vii.61, the fourth in the area in 34 years; a male *Ortholitha*

chenopodiata L. (*limitata* Scop.), with the central band narrowed, 19.vii.61; three *Abraaxas grossulariata* L., taken in 1958 since when the species has become scarcer and no aberrations have been taken; a male *Ennomos autumnaria* Werneb., representing the paler form, 30.ix.61, a dark female, 23.ix.60, and four examples from the numerous progeny of the above, bred in August 1961, all of which were very much alike, with dark undersides; three forms of *Cryphia perla* Schiff., a yellow, 1961, a grey, 1961 (in which year several appeared), and a darker form, 1960 (of which several appear each year). (2) a male and female *Oenosandra boisduvali* Newman from Perth, Western Australia, May 1955, where it occurs on White Gum, the male on the grey bark, and the female on white patches where the bark has fallen from the tree as it grows older.

Mr. M. G. MORRIS—Line drawings of the egg, all larval instars, and male and female imagines of *Psallus ambiguus* (Fall.) (Heteroptera, Miridae).

Mr. J. H. PAYNE—A male *Aphantopus hyperantus* L. ab. *pallens* Shultz, and a female *Coenonympha pamphilus* L. ab. *antiexcessa* Leeds, both from Northamptonshire 1961.

Mr. E. C. PELHAM-CLINTON—Lepidoptera collected in Ireland during May 1961. Glengarriff, Cork: *Eustrotia bankiana* F. Ballyvaghan, Clare: *Eupithecia intricata* Zett., new to Ireland; *Pyrausta funebris* Stroem; *Platyptilia tesseradactyla* L.; *Olethreutes arbutella* L., new to Ireland; *Epinotia augustana* Hübn., larvae on *Salix repens* L.; *E. nemoricaga* Tengst., new to Ireland; *Eucosma aspidiscana* Hübn.; *Mniophaga (Bryotropha) umbrosella* Zell.; *M. (B.) mundella* Dougl.; *Hypercallia christiannana* L. (*citrinalis* Scop.), larvae on *Polygala*; *Glyphipterix schoenicollata* Staint.; *Panacalia latreillella* Curt., Kenmare, Kerry; *Zelleria saxifragae* Staint., new to Ireland, larvae on *Saxifraga spathularis* Brot., *S. hirsuta* L. and hybrids.

Mr. A. DE POROCHIN (visitor)—A collection of 50 species of Coleoptera from Finland, most of which do not occur in this country. The collection did however contain such interesting species as *Pelophila borealis* (Payk.), *Lebia crux-minor* (L.), *Necrodes littoralis* (L.) and *Diaperis boleti* (L.).

Mr. ARTHUR PRICE—(1) Coleoptera from the Tinworks Pond at Kidwelly, Carmarthenshire, S. Wales. The exhibit also included a preliminary list of the fauna of a well-oxygenated pool in the swift flowing river Gwendraeth. The lists of the beetles and leeches are given in some detail, whilst some records are offered of: Ephemeroptera, Odonata, Plecoptera, Diptera, Mollusca and fish. The exhibit showed some of the more typical beetles which live in a fast-flowing river. Two coloured photographs were also shown of the Tinworks Pond. The beetles were: *Brychius elevatus* (Panz.) and *Haliphus fluvialis* Aubé. (Halipilidae); *Deronectes latus* (Steph.), *D. duodecimpustulatus* (F.), *D. elegans* (Panz.), *Oreodytes rivalis* (Gyll.), *O. septentrionalis* (Gyll.), *Hydroporus tessellatus* Drap. and *Platambus maculatus* (L.) (Dytiscidae); *Gyrinus urinator* Ill., *G. caspius* Méné., *G. natator* (L.) and *Orectochilus*

villosus Müll. (Gyrinidae); *Latelmis volkmari* (Panz.), *Elmis maugei* Bedel ab. *aenea* (Müll.), *Esolus parallelopipedus* (Müll.) *Limnius variabilis* Steph. (*rivularis* Rosen.), *Helichus substriatus* (Müll.) and *Dryops luridus* Er. (Dryopidae); *Hydraena gracilis* Germ. (Hydrophilidae). (2) Monochrome photographs as follows: a series of prints of *Lucanus cervus* (L.) taken in Reading, Berks., in February 1961 from a dead specimen; a series of prints of *Sepia officinalis* L. (Common Cuttlefish) taken of a living specimen at Kidwelly, 2.iv.61; Wokefield Common Fish Pond, Berks., 5.iii.61; *Lacerta vivipara* Jacquin (Common Lizard), Kidwelly, 29.viii.61; inflorescence of *Eryngium maritimum* L.; *Crabro* sp., Kidwelly, 29.viii.60. (3) Photographs in colour: a series of six prints of *Utricularia vulgaris* L. (Bladderwort), including views of the plant in the ditch at Littlejohn's farm at Reading, the flowers, the plant showing the bladders, and one photomicrograph showing a single bladder, 25.vi.61; three prints of the damsel fly, *Agrion splendens* (Harris) taken at Reading, 24.vi.61; two pictures of *Cicindela maritima* Dej., taken at Kidwelly, 26.viii.60.

Major-General A. L. RANSOME—Lepidoptera taken in recent seasons in Hants and Dorset: *Maniola jurtina* L. ab. *partimtransformis* Leeds and three females, all pale and including one ab. *bipupillata* Leeds; *Cupido minimus* Fuess., one ab. *minor* Tutt, and one underside ab. *obsoleta* Tutt; *Plebejus argus* L., one male upperside with "partimtransformis" characteristics, two male undersides, one paler and one darker, than typical, two male undersides with "obsolescens" characteristics, three female uppersides with "partimtransformis" characteristics, one female underside with "nigrescens" characteristics, and one female underside with "postradiata" characteristics and with white fringes to the hindwings; *Aricia agestis* Schiff., one male underside with "partimtransformis" characteristics, two female undersides with spot on forewings elongated, a female underside ab. *discreta* Tutt, but with other characteristics that approach "antiradiata" as used by Bright & Leeds; *Polyommatus icarus* Rott., one female upperside with homoeosis on left forewing, one female underside ab. *arcuata* Courv., one female underside with "fowleri" characteristics; *Lysandra coridon* Poda, two male uppersides, one ab. *infraviridiscens* B. & L., and one ab. *punctata* Tutt, and two females with homoeosis on the uppersides.

Mr. AUSTIN RICHARDSON—(1) Lepidoptera taken or bred from the isles of Skye and Canna, 5 to 15.viii.60: *Pieris napi* L., including heavily suffused females; *Mesoacidalia charlotta* Haw. (*Argynnis aglaia* L.) male and heavily suffused female; *Aglais urticae* L., three bright and strongly-marked examples; a female *Maniola jurtina* L.; two *Coenonympha pamphilus* L.; four male *Polyommatus icarus* Rott., two from Canna and one of the two from Skye showing an obsolescent underside; *Cerura vinula* L., a dark bred specimen; *Notodonta ziczac* L.; *Agrotis vestigialis* Hufn.; *Euxoa cursoria* Hufn.; *Ammogrotis lucerneae* L. s.sp. *renigera* Steph.; *Amathes castanea* Esp., deep red; *Eurois occulta* L., grey; *Euschesis comes* Hübn., including ab. *nigra* Tutt

and ab. *curtisii* Newman, with an extreme example of ab. *sagittifer* Cockayne from the Scilly Isles for comparison; *Hadena caesia* Schiff., a bred specimen which is a new record for Skye, iron-grey, and four more, also bred, of a similar colour but heavily speckled with orange, from Canna, with bred examples for comparison from the Isle of Man, Co. Clare, and Co. Cork; *H. conspersa* Schiff., bred from Canna, blackish except for pale stigmata and apical patches, with bred examples from the Scilly Isles for comparison; *Bombycia viminalis* F.; *Apamea furva* Schiff. s.sp. *britannica* Cockayne; *Aporophyla lutulenta* Schiff. ab. *luneburgensis* Freyer; *Celaena haworthii* Curt.; *C. leucostigma* Hübn. s.sp. *scotica* Cockayne, including ab. *fibrosa* Hübn. and intermediates; *Gortyna micacea* Esp. ab. *aurantia* Richardson; *Leucania impura* Hübn. s.sp. *scotica* Cockayne; *Anaitis plagiata* L. s.sp. *scotica* Richardson, including ab. *fasciata* Garbsk.; *Carsia sororiata* Hübn. s.sp. *anglica* Prout, with, for comparison, a typical example from Unst, believed to be the only Shetland specimen; *Dysstroma truncata* Hüfn., four examples very closely approaching *D. concinnata* Steph., *D. citratus* L.; *Xanthorhoe fluctuata* L. s.sp. *thules* Prout; *Colostygia salicata* Hübn.; *Ortholitha chenopodiata* L.; *Orthonama lignata* Hübn.; *Euphyia bilineata* L. s.sp. *atlantica* Staud.; *Hydriomena furcata* Thunb., including a brown and two reddish aberrations; *Eupithecia goossensiata* Mab.; *E. icterata* de Vill. s.sp. *cognata* Steph.; *Gnophos obfuscata* Schiff. (*myrtillata* Thunb.), including two examples speckled with brown; *Ellopiia fasciaria* L.; *Crocallis elingvaria* L., brownish forms; *Selidosema brunnearia* de Vill. s.sp. *scandinaviaria* Staud., *Zygaena purpuralis* Brün. s.sp. *caledonensis* Reiss, with three s.sp. *segontii* Tremewan, and two blown larvae from Carmarthenshire for comparison; *Z. lonicerae* von Scheven, which may prove to be a distinct subspecies, being large, heavily-spotted and hairy, caught flying on 11th August along with the *Z. purpuralis*, an incredibly late date. (2) Lepidoptera taken or bred during 1960: *Melicta athalia* Rott., Devon; *Notodonta trepida* Esp., including two ab. *fusca* Cockayne, Westmorland; *Lophoteryx capucina* L., very pale aberration, W. Ross; *Polyplocia ridens* F., long series of a very dark form, Glos., with examples from Carmarthenshire for comparison; *Apatele megacephala* Schiff. ab. *nigra* Shaw, with a typical specimen from Yorkshire for comparison; *Agrotis ripae* Hübn., a bred series from the Scilly Isles, very bright; *Amathes baja* Schiff., aberration with very distinctly marked cross-lines, Inv.; *Anaplectoides prasina* Schiff., W. Ross; *Hadena lepida* Esp. s.sp. *capsophila* Boisd., bred from the Isle of Man; *Eumichtis lichenea* Hübn., two bred from Caer., with a specimen of s.sp. *scillonea* Richardson from the Scilly Isles for comparison; *Luperina testacea* Schiff., an almost obsolete aberration from the Scilly Isles, and a second taken in the same spot two years previously; *L. dumerilii* Dup., Cornwall, taken immediately after the hurricane 'Debbie', 16th September, together with *Plusia orichalcea* F., also shown; *Apamea exulis* Lef. s.sp. *assimilis* Doubl., W. Ross; *Aporophyla lutulenta* Schiff. ab. *luneburgensis*

Freder, Inv.; *A. lunula* Stroem (*nigra* Haw.), bred Caer., with five blown larvae; *A. australis* Boisd., Cornwall; *Antitype flavicincta* Schiff., seven pale typical forms, Somerset, with two dark forms from Cornwall, and three intermediate from Portland, Dorset; *A. xanthomista* Hübn. s.sp. *statices* Gregs., Cornwall; *Gortyna micacea* Esp. ab. *aurantia* Richardson, Scilly Isles, with a grey aberration from Yorks.; *G. petasitis* Doubl., Dumb.; *Leucania unipuncta* Haw., Scilly Isles; *L. vitellina* Hübn., Scilly Isles; *L. albipuncta* Schiff., Scilly Isles: a new record; *Tiliacea aurago* Schiff., a varied series, Glos.; *Plusia gamma* L., a very pale aberration, Hants; *Dysstroma truncata* Hufn., varied series, Scilly Isles and Cornwall; *Thera obeliscata* Hübn., a strongly banded aberration, Dorset; *Lampropteryx otregiata* Metc., third Gloucestershire specimen; *Xanthorhoe birivata* Borkh., a long series of first brood specimens, Bucks., with three second brood specimens from Surrey, and two blown larvae, one green and one brown; *Rhodometra saccharia* L., including ab. *labda* Cramer, Wilts.; *Venusia cambrica* Curt., a long, varied series of dark specimens, including several ab. *bradyi* Prout, with a typical example from Lancs.; *Entephria flavicinctata* Hübn., Yorks., with s.sp. *ruficinctata* Guen., Perth., for comparison; *Earophila badiata* Schiff., bred Cheshire, including ab. *eckfordii* Smith; *Eupithecia virgaureata* Doubl., three examples including two approaching ab. *nigra* Lempke, bred Scilly Isles, a new record; *Alcis repandata* L. ab. *sodorensium* Weir, W. Ross. 15th August; *Diaemia ramburialis* Dup., Hants, 3rd September. (3) Living larvae, last instar, of *Leucania vitellina* Hübn., from the Scilly Isles.

Mr. C. F. RIVERS—An exhibit dealing with the use of viruses in the biological control of pest insects together with colour transparencies of insect virus diseases. The use of viruses against pest insects is a highly selective and inexpensive method of control. These diseases occur naturally in insect populations and are a factor in controlling their numbers. They are specific to the host, non-toxic to man and animals and they reproduce themselves in the insect tissues. The combined effects of residual polyhedra and sub-lethal dosages ingested by the current population will induce epidemics in the successive generations. Dying larvae contaminate the trees with fresh polyhedra and the virus-carrying survivors interbreed with neighbouring colonies. An extensive infestation of Pine Sawfly, *Neodiprion sertifer* (Geof.) at Loch More in the Reay Forest, Sutherland, was sprayed with a suspension of sawfly polyhedra virus in May 1961. The insect presented a serious problem due to the absence of sufficient natural predators and parasites. The virus from 20 diseased larvae was applied to an acre of trees. A powered knapsack spray machine which produced micro-droplets made it possible to use the minimum of water. On the 200 acres treated the pest was checked whilst severe defoliation continued in the unsprayed acres.

Mr. P. J. ROPERS (visitor)—*Clerio galii* Schiff., the Bedstraw Hawk Moth.

Major A. BEDFORD RUSSELL—(1) A collection of water colours and drawings from actual specimens of butterflies, mostly of aberrations in

the exhibitor's collection. (2) A case of butterflies from Malaya, including a new species of *Nacaduba*, awaiting description; the allotype male of *Hyarotis stubbsi* Eliot; a pair of the recently discovered Malayan subspecies, *Erites medura* Horsf. s.sp. *russelli* Eliot; a pair of the Malayan race, *Artipe eryx* L. s.sp. *excellens* Eliot, and other unusual items. Taken during 1959-61. (3) A halved gynandromorph *Maniola jurtina* L., left side male, right side female, from the Warminster, Wilts., area, June 1961.

Mr. A. D. A. RUSSWURM—Some varieties of British butterflies taken during 1961. *Eumenis semele* L., four females including one showing "excessa" characteristics, two others with extra spotting on the forewings, and one with cream areas heavily suffused, New Forest, Hants, August. *Maniola jurtina* L., one dwarf male; one male with "radiata" forewings and pearl-grey hindwings; one female ab. *commaculo* Leeds; one dark suffused female with orange area of forewings almost obscured; two female undersides, one a reddish colour form and one exhibiting homoeosis, with four patches of upperside forewing scaling on the left underside hindwing, New Forest, July to August. *Maniola tithonus* L., one female ab. *excessa* Leeds, and two male ab. *antiparvipunctata* Leeds, New Forest, July. *Plebejus argus* L., one dwarf male, New Forest, July. *Aglais urticae* L., a short series bred from a number of different webs of young larvae from Dorset, including one ab. *nigrocaria* Haverkamp, which emerged 26.vi.61.

Air Marshall Sir ROBERT SAUNDBY—Races of *Eumenis semele* L. (1) The chalk down race: this has the palest undersides. (2) The heathland race: slightly darker undersides and more unicolorous. (3) The north-west coast of Scotland race: This lives amongst large black rocks near the sea shore. It is generally darker and smaller, the under-sides of the hindwings are conspicuously darker, especially in the males, and the uppersides of the hindwings of both sexes show a consistently different pattern from that of the southern races.

Mr. L. E. SAVAGE—Specimens of *Apamea exulis* Lef., four taken at sugar at Mangaster, Shetland Isles, July 1960. *A. assimilis* Doubl., taken at mercury vapour light at Dalwhinnie, Inv., July 1955. *A. monoglypha* Hufn., taken at sugar at Mangaster and Nibon, Shetland Isles, July 1960. *Hadena conspersa* Schiff., bred from larvae taken on *Silene maritima* With. at Hillswick, Shetland Isles, in July 1960, the moths emerging from 6.v.61 to 9.vi.61, with approximately three-quarters lying over until 1962. *H. caesia* Schiff., bred from larvae also taken on *S. maritima* on the Isle of Man, 1958. *H. caesia* Schiff., bred from larvae taken on *S. maritima* at Sleah Head, County Kerry, and Doolin and Black Head, the Burren, County Clare, Ireland, 1953. *H. capsophila* Dup., bred from larvae taken on *S. maritima* in County Kerry and County Clare, Ireland, 1953; and the same species bred from larvae also on *S. maritima* around the southern coast of the Isle of Man, 1958. *H. lepida* Esp., bred from larvae on *S. maritima* at the Lizard, Cornwall, 1951.

Dr. E. SCOTT—Two specimens of *Depressaria astrantiae* Hein., first taken at Stroud, Glos., 25 years ago, with a third taken at light at Westwell, Kent; *Acleris* (*Peronea*) *shepherdana* Steph., a fen species, common in a marshy field on the gault below the Wye Down, Kent; *Mecia argentimaculella* Staint., an uncommon tineid, from Westwell and Boro Green, Kent; *Pandemis* ? *dumetana* Treits., taken at light by Mr. C. A. W. Duffield, near Wye.

Mr. E. J. SCOTT (visitor)—Drawings of Lepidoptera taken in Teneriffe, Canary Islands, by A. J. Dewick, between January and March, 1957.

Mr. K. W. SELF—A book of about 250 photographs of British Lycaenidae showing aberrational and local forms. Some of the original specimens have been shown from time to time, they were obtained mainly in Dorset, Hants and Kent, in their appropriate seasons from 1941 to 1953. The species were *Lysandra coridon* Poda, *L. bellargus* Rott., *Polyommatus icarus* Rott., *Plebejus argus* L. (*aegon* Schiff.), *Aricia agestis* Schiff. (*astrarche* Bergst.) and *Lycaena phlaeas* L.

Mr. L. W. SIGGS—Specimens of Lepidoptera taken at mercury vapour light at Minstead, Hants (New Forest), 1961. *Leucania* ? *albipuncta* Schiff., 9th October; *L. vitellina* Hübn., 1st, 4th and 5th September; *Cirrhia icteritia* Hufn. ab. *aurantia* Tutt., 21st September; *Conistra vaccinii* L., with ground colour dark red-brown, subterminal band and stigmata light chestnut, 8th October; and with ground colour dark red-brown powdered with grey, subterminal band and circumscription of stigmata grey, 10th October; *Eupsilia transversa* Hufn., with ground colour very dark brown, large and small spots white, 2nd October; and with ground colour mid-brown, large and upper small spots red, lower small spot white, 8th October; *Sterrhia muricata* Hufn., 7th July; *Rhodometra sacraria* L., 30th September and 9th October; *Agriphila* (*Crambus*) *latistria* Haw., 11th August.

Mr. ARTHUR SMITH—Pen and ink drawings of Ichneumonidae and Chalcidoidea (Hym.). See also British Museum (Nat. Hist.).

Mr. R. E. STOCKLEY—Aberrations of Rhopalocera taken during recent years: *Lysandra coridon* Poda, a series of four specimens including ab. *radiata* Courv., ab. *striata* Tutt and one extreme aberration of the female ab. *extrema* Courv., from the south downs, 6.viii.55; *Coenonympha pamphilus* L., one male underside albino and one melanic upperside; *Maniola jurtina* L., melanic female?; set underside, Surrey, 14.vii.60.

Miss VERE TEMPLE—(1) Watercolour drawing on thin Chinese paper showing the Japanese Hairstreak, *Zephyrus signata* Butler, on a spray of oak, including caterpillar, chrysalis and imago. (2) A watercolour drawing in designers colours on thick Chinese paper showing the Japanese Owl Moth, *Brahmaea japonica* Butler on privet, including caterpillar, pupa and imago.

Mr. R. TUBBS—*Erebia aethiops* Esp., imagines taken at Morar, Inverness-shire, between 6 and 16.viii.61, illustrating in particular the two colour forms of the female underside; the ochre banded form, which seems to constitute the aberration *ochracea* Tutt, and the silver banded

form. Also shown were larvae of the species hibernating in their second and third instars, and the foodplant, *Molinia coerulea* (L.) Moench.

Mr. M. W. F. TWEEDIE—(1) Some moths characteristic of the coast between Rye and Lydd, Kent: *Spilosoma urticae* Esp., *Euxoa tritici* L., *Agrotis vestigialis* Hufn., *A. clavis* Hufn., *Hadena lepida* Esp., *H. conspersa* Schiff., *H. suasa* Schiff., *Aporophyla australis* Boisd. s.sp. *pascuea* Curt., *Hydraecia paludis* Tutt, *Omphaloscelis lunosa* Haw., *Hoplodrina* (*Caradrina*) *blanda* Schiff., *Ortholitha plumbaria* F., *Mesotype virgata* Hufn., *Aspitates ochrearia* Rossi, *Agriphila inquinatella* Schiff., *Pediasia aridella* Thunb., *Platytes cerusellus* Schiff., *Schoenobius gigantellus* Schiff., *Homocosoma sinuella* F., *H. binaevella* Hüb., *Eurhodope marmorea* Haw., *Synaphe punctalis* F., *Pyrausta cespitalis* Schiff. (2) An album of photographs of British Insects.

Mr. R. W. J. UFFEN—*Chrysolina banksi* (F.) (Col., Chrysomelidae) larvae, with adults taken at Higham, Kent.

Professor G. C. VARLEY—Peculiar structures in the males of moths. The males of many moths have "scent brushes" on various parts of the body, or extensile "coremata" which can be inflated. Detailed observation by Master Gaden Robinson of Kuala Lumpur of the Arctiid moth *Cretonnotus gangis* L. supported by very fine colour transparencies show that males assemble to the "calling" female, settle a yard or so away and then inflate their enormous coremata. Eventually one male mates and the other males then quickly retract their coremata and rest until next evening. Comparable, but smaller coremata are present in many British species. They can be inflated by air pressure and dried as one dries a caterpillar skin. This method also extends scent fans and scent stars in various parts of the bodies of the male Geometridae, Noctuidae, Arctiidae, Thyatiridae, etc. The scent fans near the base of the abdomen of noctuids like *Apamea* (*Xylophasia*) *monoglypha* Hufn., smell strongly of valerian oil when first extended. Other species smell of almonds, or like carabid beetles. I can find no record of anyone observing these structures in life in this country. Observations of mating displays would probably reveal their function.

VIRUS RESEARCH UNIT, Cambridge.—see Mr. C. F. Rivers

Mr. S. WAKELY—Lepidoptera bred or caught during the current year from different localities as follows: Wood Walton Fen, Hunts.: *Aristotelia morosa* Mühl., *Gelechia sororculella* Hüb. and *Acrocercops imperialella* Mann., all bred; also *Lampronia praelatella* Schiff. Isle of Wight, Hants: *Apoda avellana* L., *Mecyna asinalis* Hüb., bred, *Caloptilia pyrenaella* Chrét., a fine bred series, and *Nemotois cupriacella* Hüb. Kent: *Lophopteryx cucullina* Schiff., *Apamea scolopacina* Esp., *Hydraecia hucherardi* Mab., *Eana incanana* Steph., *Brevisociaria* (*Phalonia*) *curvistrigana* Staint., *Acleris shepherdana* Steph., *Telephila schmidiella* Heyd., *Hypercallia christiannana* L., *Enicostoma lobella* Schiff., *Ethmia bipunctella* F. and *Coleophora olivaceella* Staint., all bred, also *Adela croesella* Scop. Camberwell, S.E. London: *Pyrrhia umbra* Hufn., *Ennomos quercinaria* Hufn. and *Coleophora clypeiferella* Hofm. Suffolk: *Leucania favior* Barr.,

Nonagria neurica Hübn., *Apamea oblonga* Haw., *Scopula emutaria* Hübn., *Witlesia reticella* Newm., *Nephopterix formosa* Haw., *Epischnia boisduvaliella* Guen., *Nyctegretis achatinella* Hubn., *Melissoblastes zelleri* Joan., *Platytes alpinellus* Hübn., *Crombruggia distans* Zell., *Phalonidia manniana* F.R., *Eucosma maritima* Westw., *Aristotelia palustrella* Dougl., *A. pictella* Zell. and *Batia lambdella* Don. Surrey: *Chloroclystis debiliata* Hübn., *Epinotia immundana* F.R., *Gelechia relocella* Dup. and *Amphibatis incongruella* Staint. Sussex: *Hyphenodes turfosalis* Wocke, *Gymnancyla canella* Schiff., *Choristoneura diversana* Hübn., *Eudemis porphyra* Hübn., *Stomopteryx vinella* Bankes and *Ypsolophus horridellus* Treits. These are only the most noteworthy moths of some 200 different species exhibited.

Mr. D. H. WALKER—A series of fossils comprising the brachiopod *Terebratula biplicata* Brocchi found in the upper chalk at Purley, Surrey, April 1961, a very complete and beautiful example; a piece of fossilized timber found in the desert near Albuquerque, Arizona, U.S.A., August 1943, which is an interesting example of molecular replacement retaining exactly every detail of shape and colour; two examples of the sea urchin *Micraster cor-anguinum* Leske (Echinoidea), found in the upper chalk at Purley, Surrey, 1937; and three tests of the sea urchin *Echinocardium caudatum* Muller (Echinoidea) found on the sea shore at Amroth, Pembro., August 1961. The two sea urchins are very similar in almost every detail but separated in their lives by several million years.

Mr. NORMAN A. WATKINS—British Rhopalocera as follows: *Melanargia galathea* L., including three ab. *valentini* Williams; a male transitional form bred from a similar female taken in Gloucestershire, 1960; two similar females caught wild in Gloucestershire 1961 and Somerset 1961; an albinistic male, from Gloucestershire 1961; two male ab. *nigricans* Culot, one wild Gloucestershire specimen 1961: and the other bred 1961 from a wild caught female ab. *nigricans* taken in 1960, both males have been paired in captivity with ab. *nigricans* females bred from a female taken in Gloucestershire, 1960. *Lysandra coridon* Poda, a male ab. *caeca* Courv., Wilts., 1961; a male "juncta" form approaching ab. *parallela* Courv., Wilts., 1961; a female ab. *antialbescens* B. & L. + *antiradiata* B. & L. + *postdiscreta* B. & L. (which also approaches ab. *basiextrema* B. & L.), Sussex, 1961. *Lysandra bellargus* Rott., examples from a small race discovered by Mr. N. B. Potter on greensand in Hampshire 1960. These represent the 1960 summer brood and 1961 spring brood. During the summer this year this locality was burnt, ploughed and planted with buckwheat for feeding pheasants. No specimens of the summer brood were seen this year and it can reasonably be assumed that this race is now extinct. Uppersides: a male ab. *metallica* Tutt, with thin scaling on all wings; four male forms approaching ab. *metallica* Tutt, with hindwings very thinly scaled and forewings with rayed melanic striations. Undersides: four males and a female radiated form extending to full ab. *radiata* Oberth., summer 1960, previously exhibited by Mr. Potter at our Annual Exhibition 1960; four

males and one female of a similarly radiated form, spring 1961.

Mrs. N. I. WATSON—*Melanargia galathea* L., male underside with black markings reduced, and an asymmetrical female underside from Dorset, July 1961; *Maniola tithonus* L., one dark male, three male ab. *excessa* Leeds, one male with pale right forewing, another approaching the albino form, one female with pale areas on both forewings, and a female albino, New Forest, Hants, July and August 1961; *M. jurtina* L., one dwarf male and another with bleached right forewing, a lavender coloured male, one approaching the albino form, a series of six upperside females, some with apical spot reduced and another with divided spot, a dark female with bright orange areas on forewings, a female approaching the albino form, another with rayed forewings, a dwarf female with apical spot almost obsolete, a series of eight female undersides showing considerable variation in colour and marking, a female with strikingly barred hindwings, a male underside with peculiar pale patches, New Forest and Dorset, June to October 1961; *Aphantopus hyperantus* L., three ab. *arete* Mill, a series with greatly reduced spots, a male with bleached left forewing, another with hindwings suffused with black scales, and a female with spots greatly enlarged, New Forest, July 1961; *Coenonympha pamphilus* L., a large female upperside and another underside, a male underside with apical spots obscured by pale patches, an upperside with cream areas and another completely white form, New Forest and Dorset, July to September 1961; *Melitaea cinxia* L., a male with albino hindwings, bred ex Isle of Wight, June 1961; *Euphydryas aurinia* Rott., a series of 12 selected forms bred from Hod Hill, Dorset, which emerged during May 1961; *Aglais urticae* L., various colour forms including one with central spots joined and extended outwards, and one partly emerged variety bred ex Stourplaine, July 1961; *Plebejus argus* L., three males with "latiora" characteristics, a female with "partim-transformis" characteristics, and a series of male and female undersides from the New Forest, July 1961; *Aricia agestis* Schiff., a series of four undersides including one extreme ab. *discreta* Tutt, Dorset, July 1961; *Polyommatus icarus* Rott., a series of male and female upper and undersides including ab. *arcuata* Courv., etc., and one with greatly enlarged orange lunules, Dorset, June to September 1961; *Lysandra coridon* Poda, four male upperside aberrations, *fowlerimargino* B. & L., *caeruleo* Tutt, *viridescens* Tutt and *lavendula* B. & L., also the male underside aberrations *i-nigrum* Tutt, *arcuata* Courv. and *confluentiae* Courv., and female underside aberrations *postobsoleta* B. & L., *i-nigrum* Tutt, etc., Dorset, July to August 1961; *L. bellargus* Rott., a series of male underside aberrations including *minor* Tutt, *caeca* B. & L., *posticoobsoleta* Tutt, *parvipuncta* Courv., *arcuata* Courv., examples with "anticaeca", "glomerata" and "semilimbojuncta" characteristics, and an un-named form with two streaks running parallel to the costa, a series of female uppersides with blue suffusion approaching ab. *ceronus* Esp., and a female underside ab. *posticoobsoleta* Tutt., Dorset, September 1961.

Mr. A. J. WIGHTMAN—see Mr. G. M. Haggett.

Dr. C. G. M. DE WORMS—(1) A selection of butterflies and moths taken in the British Isles during 1961. Series of the following species: *Coenonympha tullia* Müll., from Meathop Moss, Witherslack, Westmor.; *Harpyia* (*Cerura*) *bifida* Brahm (*hermelina* Goeze preoc.), from Ham Street, Kent; *Spilosoma lubricipeda* L. (*menthastri* Esp.), from the Isle of Mull; *Agrotis trux* Hübn., from north Wales; *Ammogrotis lucernea* L., from North Wales; *Amathes agathina* Dup., from Thursley, Surrey; *Eumichtis lichenea* Hübn., from Portland, Dorset; *Leucochlaena oditis* Hübn. (*hispida* Gey.), from Portland; *Antitype flavicincta* Schiff., the dark form from South Devon; *Orthosia gothica* L., the dark form bred from Aviemore, Inv.; *Leucania l-album* L., from south Devon; *L. vitellina* Hübn., from south Devon; *Plusia pulchrina* Haw., from the Isle of Mull; *Ennomos autumnaria* Wernb., bred from Ashford, Kent; *Zygaena loti* Schiff. (*achilleae* Esp.), a variable series from the Isle of Mull; *Z. purpuralis* Brün., from the Isle of Mull; *Hepialus fusconebulosus* Deg., a variable series from the Isle of Mull. (2) Uncommon species and aberrations of British moths taken or bred during 1961: *Asphalia diluta* Schiff., a melanic specimen taken at Chiddingfold, Surrey, 5th September, and another with very faint markings taken at Virginia Water, Surrey, 2nd September; *Euproctis similis* Feussl., a male with heavy spotting from East Suffolk, 5th August; *Spilosoma lutea* Hufn., a male and a female with very light markings bred from Ham Street, Kent, in August; *Cyenia mendica* Clerck, a gynandromorphous specimen with left wings white female and with right wings dark male coloration and markings, taken at Horsell, Surrey, 7th May, possibly a unique form (Pl. II, fig. 8); *Cybosia mesomella* L., a male with the forewings yellow, from Ham Street, 4th June; *Cryphia perla* Schiff., a deep grey example from Horsell, 9th September; *Utetheisa pulchella* L., a male captured at Prawle, south Devon, 17th September; *Euxoa tritici* L., an example with very dark markings, taken in east Suffolk, 5th August; *Diataraxia oleracea* L., an example with the outer white line absent, taken at Witherslack, Westmor., 27th June; *Procus literosa* Haw., a male with very pale coloration, from Woking, Surrey, 3rd September; *Nonagria neurica* Hübn., two males taken in east Suffolk, 6th August; *Leucania albipuncta* Schiff., a male taken near Rye, Sussex, 25th August; *Sterrhia eburnata* Wocke, two males taken in north Wales, 30th June; *Coenocalpe lapidata* Hübn., a male bred from Rannoch, Inv., 24th August; *Menophra* (*Hemerophila*) *abruptaria* Thunb., a melanic example, ab. *fuscata* Tutt, taken at Horsell, 26th April; *Apocheima hispidaria* Schiff., a melanic male taken at Horsell, 7th March; *Pseudoboarmia punctinalis* Scop., a melanic male taken at Horsell, 25th May, and a female with very pale markings taken at Ham Street, 4th June. (3) A selection of butterflies taken in the Canary Islands and in Central Spain during April 1961. (4) On behalf of Sir ERIC ANSORGE, *Tiliacea aurago* Schiff., a specimen of unicolorous marking with the usual cross bands on the forewings absent, probably referable to ab. *unicolor* Tutt.

Mr. L. D. YOUNG—(1) A series of six *Lycaena phlaeas* L. ab. *radiata*

Tutt, showing the following additional variation: a male upperside with left forewing exhibiting "transformis" characters, another with right forewings with "transformis" characters, and one without basal spots, all bred Surrey, July 1958; female uppersides—an example with raying extended towards the centre of the wings, bred Surrey, May 1960; and ab. *cupreopunctata* Tutt, bred, Surrey, September 1958; female underside—an example with basal and discoidal spots on the right forewing joined, bred Surrey, July 1958. (2) Three further *L. phlaeas* L.: an extreme female upperside aberration captured 4.viii.60 in Herts., also exhibited last year; a heterozygote female underside from a back cross between a normal but heterozygous male and a homozygous female ab. *radiata* Tutt (Ford., E. B., 1945, *Butterflies*, London, p. 182) with darker scaling on the ground colour of the hindwings which could possibly be another recessive character, bred Surrey, May 1960; a male underside having hindwings with grey scales raying outwards from the submedian spots, bred Surrey, July 1959. (see Pl. II, fig. 7).

9th NOVEMBER 1961.

The PRESIDENT in the Chair.

The death was announced of Mr. J. O. T. Howard.

EXHIBITS.

The PRESIDENT—A species of mirid bug new to science, *Globiceps woodroffei* Wagner, which has been recorded from Blackdown, Sussex, and from Witley Common, Surrey.

Mr. A. E. GARDNER—A living example of the cockroach *Nauphoeta cinerea* (Ol.), found in bananas at Newtonmore, Inv., by Comdr. G. W. Harper, 25.ix.61. It is a tropicopolitan species, omnivorous and kills and eats the cypress roach, *Diploptera dytiscoides* (Serv.).

Mr. R. W. J. UFFEN—Blotch mines and cocoons of *Nepticula* (*Stigmella*) *subbimaculella* Haw. (Lep., Nepticulidae) from Wimbledon Common, Surrey, with a gallery mine more typical of the family for comparison.

Mr. T. R. EAGLES—Seed spikes of *Plantago maritima* L. galled by the beetle *Mecinus collaris* Germ. (*Curculionidae*) from Higham, Kent.

Mr. S. R. BOWDEN—Two larvae of *Pieris napi* L. ab. *bryoniae* Ochs., of the Carpathian subspecies *neobryoniae* Sheljuzhko (Lep., Pieridae) showing what is suspected to be spiral segmentation, part of an F₂ brood of about 200 individuals.

Capt. J. ELLERTON—Male and female *Rhodometra sacraria* L. (Lep., Geometridae), bred from larvae which were reared by Mr. S. Wakely from ova laid by a female caught near Chiddingfold, Surrey. The larvae pupated about 31st October and the moths emerged seven days later.

COMMUNICATIONS.

The SECRETARY read a letter from Mr. R. C. Dyson which accompanied a gall on beech and which requested information. The gall had

disintegrated and determination was difficult, but the PRESIDENT suggested it might have been made by an eriophyid mite.

Mr. G. E. NIXON, B.A., F.R.E.S., gave a talk on "The habits of some parasitic Hymenoptera", which was followed by a series of questions covering such aspects as the determination of these parasites, hyperparasitism, family characteristic in cocoon formation, tertiary parasitism, etc.

23rd NOVEMBER 1961.

Mr. A. E. GARDNER, Vice-President, in the Chair.

The following new members were declared elected: Messrs. G. M. A. Barker, W. V. D. Bolt, D. O. Chanter, J. E. A. Ranger, A. Robertson and P. F. G. Twinn.

EXHIBITS.

Mr. A. E. GARDNER—A series of *Rhagonycha elongata* (Fall.) (Col., Telephoridae) beaten from Scots Pine, Aviemore, Inv., 1.viii.61.

Dr. C. G. M. DE WORMS—A female *Nycterosia obstipata* F. (Lep., Geometridae), taken in mercury vapour light trap at Woking, Surrey, 23.xi.61 and a *Brachionycha sphinx* Hufn. (Lep., Noctuidae) from the same trap, 22.xi.61.

Mr. R. W. J. UFFEN—Two of the three volumes of Hering's *Keys to the leaf miners of Europe*.

Mr. F. D. BUCK—A copy of the recently published *International Code of Zoological Nomenclature* (see review on p. 166).

COMMUNICATIONS.

Mr. T. R. EAGLES referred to the note about the fly *Thaumatomyia notata* Meig. (Dipt., Chloropidae) in *Proc. S. Lond. ent. nat. Hist. Soc.*, 1959: 23. These flies had again occurred in his house at Enfield, Middx., in vast numbers. He also said that the fungus *Boletus chrysenteron* (Bull.) Fr. had appeared abundantly in October in the roadside verges at Enfield. Almost every example had been attacked by a secondary fungus. The galls on oak leaves, he also reported, caused by *Neuroterus albipes* (Schenk) f. *lenticularis* (Ol.) (Hym., Cynipidae), the alternate generation of *N. baccarum* L. were unusually numerous this year.

Mr. R. M. MERE referred to the *Drepana harpagula* Esp. (Lep., Drepanidae) he showed at the Annual Exhibition. He said he wished to make it clear that he did not discover the new locality, but was told of the area in which one was taken and had been fortunate on the night he had used his light there.

An article in the *Canadian Entomologist* regarding *Thymelicus lineola* Ochs. (Lep., Hesperidae) was referred to, in which it was stated that since the species was introduced into Canada a few years ago it had become a pest. The distribution in Britain was discussed and it appeared to occur in southern Suffolk, Essex, Kent, Surrey, and as far

west as Wilts. It was also thought that it might even have reached Somerset.

Mr. R. W. J. UFFEN drew attention to a complicated group of microlepidoptera in the genus *Coleophora* (Coleophoridae). We used to have two species in our list, *C. troglodytella* Dup. and *C. therinella* Tengst.; but it was subsequently shown that there were two other species, *C. derivatella* Zell. and *C. peribenanderi* Toll respectively. It was then discovered that the two original species also occurred with us, and a further species, *C. ramosella* Zell. has been added. Mr. J. D. Bradley, by an examination of types, recently showed *C. trochilella* Dup. to be the species now known as *C. troglodytella* Dup., and not a synonym of *C. therinella* Tengst. as has commonly been supposed. The type of *C. troglodytella* Dup. is imperfect, so it is not yet certain whether it will become a junior synonym of *C. trochilella* Dup. To relate these with their host-plants we have *C. troglodytella* Dup. bred from *Eupatorium* in Ireland, but from several Compositae abroad; *C. ramosella* Zell. bred from *Solidago* in Ireland; *C. derivatella* Zell. from *Eupatorium* and *Inula* in Ireland, Norfolk and Surrey; *C. peribenanderi* Toll, from *Carduus arvensis* (L.) Scop. in Middx., Kent and Surrey; *C. therinella* Tengst., taken in Ireland, but not as yet reared in Great Britain. On the Continent it feeds on thistle.

Mr. R. F. HAYNES reported taking *Ptilophora plumigera* Schiff. (Lep., Notodontidae) at Ashford, Kent, 18.xi.61.

Coloured transparencies were shown by Messrs. M. W. F. Tweedie, W. E. Minnion, J. D. Bradley and F. T. Vallins. Mr. Tweedie drew attention to the *Catocala fraxini* L. (Lep., Noctuidae) bred from Continental stock which had been liberated in the Rye area of Sussex.

14th DECEMBER 1961.

The PRESIDENT in the Chair.

EXHIBITS.

THE PRESIDENT—*Braula coeca* Nitzsch (Dipt., Braulidae) a minute louse-like insect with short thick legs, vestigial eyes, and devoid of wings and halteres. The adult attaches itself to the thorax of queen and worker bees. Its eggs are laid among the brood combs, and hatch into musciform larvae which enter the capped cells of the combs. The larvae do not cause much harm.

Mr. A. E. GARDNER—A living example of the cockroach *Pelmatosilpha marginalis* Brunner, found in bananas at Feltham, Middx., 3.xii.61.

Mr. T. R. EAGLES—A frond of the fern *Polypodium interjectum* Shivas with ripe sori. This was gathered in his garden at Enfield, Middx., but the plant came from Ilfracombe, Devon. He drew attention to the statement by Clapham, A. R., Tutin, T. G. and Warburg, E. F. (1952, *Flora of the British Isles*, London, p. 50), "The three chromosome forms are morphologically separable and should be regarded

as distinct spp. but the details have not yet been worked out". The three species have now been dealt with in *J. Lin. Soc. (Bot.)*, **58**, 370, p. 13, and are *Polypodium australe* Fée, *P. vulgare* L. sensu stricto and *P. interjectum* Shivas. The reasons for saying the exhibited specimen is *P. interjectum* Shivas are: (1) ripe sori appearing at this time of the year (December); (2) sori oval and not round; (3) lower pinnae projecting forward; (4) the fourth and fifth pinnae from the base the longest; and (5) no paraphyses traced.

COMMUNICATIONS.

Mr. S. N. A. JACOBS gave preliminary notice of a nepticulid (Lep.) new to the British list from a locality near East Malling, Kent. which occurs on *Acer campestre* L. (Common Maple). The insect is *Stigmella aceris* Frey.

Lt.-Col. W. B. L. Manley read a paper "Collecting Lepidoptera in Spain". This was followed by a series of both coloured and monochrome slides related to the subject and showed by Capt. N. D. RILEY. The meeting concluded with questions and a discussion.

11th JANUARY 1962.

Mr. A. E. GARDNER, Vice-President, in the Chair.

The following new members were declared elected: Mr. H. Whitehead and Mr. T. K. Brown.

EXHIBITS.

Mr. A. E. GARDNER—(1) A series of the northern clavicorn beetle *Anisotoma glabra* Kug. (Leiodidae) taken under fir bark at Nethy Bridge, Inv., 3.viii.61. (2) The very local weevil *Otiorrhynchus scaber* (L.) (Col., Curculionidae) beaten from pine, Aviemore, Inv., 24.vii.61.

Mr. K. A. SPENCER—Three species of South African Diptera which he had taken as pupae on *Senecio pterophorus* DC. at Pietermaritzburg. The species included a chloropid, *Polyodaspis* sp. near *robusta* (Lamb.) and a trypetid, *Stenotrypeta vivax* Munro.

Mr. S. WAKELY—A dozen selected examples of *Rhodometra sacraria* L. (Lep., Geometridae) which he had recently bred. The original parent was taken near Chiddingfold Surrey, by Mr. R. Fairclough, and four generations were bred. The fourth generation emerged during Christmas week, but no fertile ova were obtained.

COMMUNICATIONS.

The LIBRARIAN reported on the following additions to the library: *Bird Song* by W. H. Thorpe, the biology of vocal communication and expression in birds, No. 12 of the Cambridge Monographs in experimental biology, Cambridge, 1961. *International Code of Zoological Nomenclature* adopted by the XV International Congress of Zoology,

H. R. Stoll (Chairman), London, 1961. *Coleoptera of Somerset* by W. A. Wilson, F.R.E.S., published by the Somerset Archaeological and Natural History Society, Taunton, 1958. *Check List of the British Lepidoptera* with the English name of each of the 2,299 species, by I. R. P. Heslop, London, 1945. *Indexed Check List of the British Lepidoptera* with the English names of each of the 2,313 species, by I. R. P. Heslop, London, 1947. Supplements 2, 3 and 4 to the last foregoing work. *British Flies*, vol. VI, Empididae, by J. E. Collin, parts I and II, Cambridge, 1961. *The Diagnosis of Mineral Deficiencies in Plants by Visual Symptoms*, by T. Wallace, London, 1951, H.M.S.O. (Presented by R. G. Chatelain). The librarian also reported that our member, Mr. Roger Long, had presented two items published by the Société Jersiaise. (1) Sectional Reports for 1960 dealing *inter alia* with the local Lepidoptera and (2) Ecological notes by another of our members, Lt.-Col. F. C. Fraser, I.M.S. (RETD.), on two species of Odonata found in Jersey, *Lestes viridis* v.d. Lind. and *Aeshna mixta* Lat.

Mr. A. PRICE said that during the Christmas holidays he had observed two pairs of *Dytiscus marginalis* L. (Col., Dytiscidae) in cop. under some 4½ inches of ice in a pond in west Wales. He said there was a gap of approximately ⅓ to ¼ inch between the ice and the water. Though he made a hole in the ice, the beetles did not show any particular interest in it. Later in the week the thickness increased to 6 inches. A discussion followed on the formation of ice on ponds with relation to the possibility of a gap between the ice and the water.

Lantern slides were shown by Dr. C. G. M. de Worms, Mr. R. F. Haynes and Mr. F. T. Vallins.

25th JANUARY, 1962.

90th ANNUAL MEETING

(With which was combined the Ordinary Meeting)

The President, Dr. A. M. MASSEE, O.B.E., F.R.E.S., in the Chair.

The minutes of the 89th Annual Meeting were read, confirmed and signed.

The Hon. Treasurer presented his Report and Accounts, and as the auditors had not completed their work, moved their adoption subject to audit. These were seconded by Mr. Arthur Smith and carried.

Dr. B. J. MacNulty read the Council's Report for 1961 and moved its adoption. Mr. S. N. A. Jacobs seconded the Report and it was carried.

The President declared the following Officers and Ordinary Members of Council elected: *President*, A. E. Gardner, F.R.E.S.; *Vice-Presidents*, A. M. Massee, O.B.E., D.S.C., F.R.E.S., J. L. Messenger, B.A.; *Treasurer*, J. L. Henderson; *Secretary*, B. J. MacNulty, B.Sc., Ph.D., F.R.I.C.; *Editor*, F. D. Buck, A.M.I.P.T.G.M., F.R.E.S.; *Curator*, M. G. Morris,

F.R.E.S.; *Librarian*, F. T. Vallins, A.C.I.I., F.R.E.S.; *Lanternist*, H. G. Denvil, F.R.E.S., F.R.H.S.; *Ordinary Members of Council*, J. D. Bradley, F.R.E.S., L. Christie, E. W. Classey, F.R.E.S., D. P. L. Matthews, T.D., B. F. Skinner, A. Smith, A.R.C.A., D. W. Thorpe-Young, A.I.A.C., R. W. J. Uffen, F.R.E.S., S. Wakely, C. G. M. de Worms, M.A., PH.D., F.R.I.C., F.R.E.S., M.B.O.U.

Under Bye Law 25 (b) Mr. R. F. Haynes asked for details of the qualifications for Country Membership. The Hon. Secretary explained these to Mr. Haynes' satisfaction.

The following new members were declared elected: Messrs. T. W. Harman, T. J. Goodman and A. Woolacott.

EXHIBITS.

The PRESIDENT—The Snow Fly, *Boreus hyemalis* (L.) (Mecop., Boreidae), the only British species of the family. It is locally common in the British Isles, and the exhibitor has examples from Kent and Scotland, those exhibited were from East Malling, Kent. The insect lives amongst moss or under stones, and is peculiar in that it feeds upon vegetable matter. The adults occur in the late autumn and winter and are occasionally found walking on snow. The larva is strongly curved, the thoracic legs are large but there are no abdominal feet.

Mr. S. N. A. JACOBS—A mine of *Stigmella aceris* Frey (Lep., Nepticulidae) in *Acer campestre* (L.), from Comp Farm, Malling, Kent. The moth flies in July and again in late August and September. Mines were found empty on 20.viii.49. The species is new to the British List.

Mr. T. G. HOWARTH—A living male example of *Conistra ligula* Esp. (Lep., Noctuidae), which came to light at Arkley, Herts., 20.i.62.

Mr. A. E. GARDNER—A short series of the local European earwig *Pseudochelidura sinuata* (Germ.). The male is referable to ab. *dufourii* (Serv.) which differs from the typical form by having sinuate forceps. All specimens were from Caunterets, Hautes Pyrenees, France, 18.v.54 and were collected by Dr. B. P. Moore.

COMMUNICATIONS.

A query was raised regarding the habitat of the Snow Fly and where it could be found when there was no snow on the ground. Dr. MASSEE said he could give no further information than that already given—he had in fact tried to find the insect himself when there was no snow, but had not been successful. Mr. L. CHRISTIE said he had found them on West Wickham Common, Kent, in the autumn, in moss on trees.

The President then read his Address; following which he called upon Mr. A. E. Gardner to occupy the Chair. On doing so, Mr. Gardner moved a vote of thanks to Dr. Massee and asked permission for the Society to publish his Address. To which Dr. Massee agreed.

A vote of thanks to the Vice-Presidents, Officers and Council was moved by Mr. E. W. Classey and seconded by Mr. S. Wakely. Mr. R. M. Mere replied.

THE PRESIDENT'S ADDRESS

By A. M. MASSEE, O.B.E., D.S.C., F.R.E.S.

Read 25th January 1962

The year 1961 has followed the same pattern as previous years, and the most outstanding event was the Annual Exhibition at the end of October, when 100 exhibits were on show for members and friends to view and comment upon with fellow entomologists. At the end of September a Special Meeting was held to discuss the proposed change of name of the Society, as the present name was considered by some to be too parochial for a Society of such distinction. Fifty-three members attended the meeting and the motion to change the name was lost by nine—32 votes to 23; thus the Society retains its old identity of 'South London'.

During 1961 the membership has reached a total of 539, higher than in any former year, and this achievement is undoubtedly due to the hard work put in by Mr. R. M. Mere during his term of office in 1960.

Our finances, always a matter of concern to the Council, have again been in the care of Mr. J. L. Henderson, and as always his sound judgment and skill in monetary matters proves invaluable to the Society.

The Society has suffered loss by the death of five of its members, and I shall refer briefly to these gentlemen:—

Leonard Talman Ford died on 9th January, and an Obituary Notice concerning his services to entomology appeared in the 1960 volume of the Proceedings and Transactions of this Society.

Sir Leonard D. Wakely died on 27th February at the age of eighty. In 1902 he entered the India Office. He was Secretary of the Political Department from 1924 to 1930 and then was appointed as Under-Secretary of State and Clerk to the Council of India. In 1934 he was appointed Deputy Under-Secretary of State. He was made a K.C.I.E. in 1935.

Sir Leonard's interest in Lepidoptera started when he was an under-graduate at Cambridge. He was interested only in the macro-lepidoptera, and collected widely in many famous localities, including Wicken Fen, The New Forest, the Isle of Wight, Aviemore, Cannock Chase, Wood Walton Fen and Witherslack, to mention only a few. He preferred beating and sugaring to the more modern methods of obtaining specimens. His very representative collection of Lepidoptera and that of his relative—A. R. Kidner, have passed to John Wakely, a member of the 'South London'.

Mr. J. Oliver T. Howard died in October. He joined the Society in 1927, and was President in 1947. He was also an Assistant Editor. His interest in entomology was mainly confined to the Lepidoptera.

The deaths were reported recently of Dr. J. Michaud and Mr. A. Valentine. They both joined the Society in 1945 and were interested in general entomology.

In the Birthday Honours, Her Majesty the Queen was graciously pleased to honour our member, Col. E. Scott, with the Order of the British Empire.

We also wish to congratulate Dr. H. E. Hinton, a distinguished member, on being admitted to the Fellowship of the Royal Society.

My period of office has been a very pleasant one because of the help and support I have received from Dr. B. J. MacNulty, our new Secretary, and the assistance and wise council given to me by my Vice-Presidents, Mr. R. M. Mere and Mr. A. E. Gardner.

Mr. F. D. Buck has fulfilled his duties as Editor with calm distinction, and the Society is greatly indebted to him for all the work he does on our behalf.

Mr. T. G. Howarth selected a number of competent speakers for the indoor meetings, one of the special features of the Society. Mr. R. W. J. Uffen arranged a varied selection of famous localities for the Field Meetings for those interested in field entomology. Many were well supported.

It was a sad day for the Society when Mr. T. R. Eagles decided to relinquish the post of Librarian, but there is some real consolation in the fact that Mr. F. T. Vallins has agreed to fill the vacancy. He was formerly Assistant Librarian.

It is my real pleasure to express my gratitude to members of Council, Officers and members of the Society for their help and courtesy to me during my year as President.

Finally, for the entomological section of my address I have chosen to discuss the 'Apple Orchard Fauna' because as the result of 40 years research in fruit entomology I have formed quite definite views on measures which should be adopted to control fruit pests.

APPLE ORCHARD FAUNA

A great variety of harmful phytophagous arthropods were associated with deciduous fruits in the south-east of England during the first 20 years of the present century. In addition, large numbers of predacious, parasitic and neutral arthropods were also present, but they are not so well-known to the fruitgrower or the entomologist as the more harmful species.

The fruit insects of this country have been studied in detail for over a hundred years, and it has long been the custom of economic entomologists to work out the life histories and habits of the more important pests, to determine the critical stage of their life when control measures can be effectively directed against them. Following these studies carefully thought out spraying trials are planned with a view to testing a wide range of chemicals aimed at the destruction of the pests. Such trials are frequently made against a specific pest, with little or no regard being paid to the numerous other arthropods present in the orchard; or indeed without taking into account other insecticides and fungicides which are included in the spray schedule.

Before the first World War the commercial orchards were rarely, if ever, sprayed, because the appliances available were crude hand manuals and barrel pumps, which made the application of chemicals a very tedious and lengthy business. The chemicals used were the hot-lime wash and caustic soda preparations. The grease banding of the tree trunks was commonly practised to prevent the wingless females of the Winter Moth group ascending the trees. In fact, the apple orchards of 50 years ago would be regarded as derelict by present-day standards.

Before discussing the population and species changes of the fauna in detail, and citing classic examples of these changes, it will be expedient to discuss in some detail the arthropods associated with the apple orchards before spraying became a recognised routine of orchard hygiene (Massee 1954).

The amateur entomologist does not have ready access to commercial orchards, and consequently may not be familiar with the very varied fauna which covers a wide field of the Insecta. Actually, nine Orders of the Insecta are represented. They are as follows:

DERMAPTERA, PSOCOPTERA, THYSANOPTERA, HEMIPTERA-HETEROPTERA, HEMIPTERA-HOMOPTERA, NEUROPTERA, LEPIDOPTERA, COLEOPTERA, HYMENOPTERA, DIPTERA.

Most of the insects associated with the unsprayed orchard have been determined, and about 120 species are known. In addition the Orders Acarina and Arachnida contribute important species to the fauna.

The species of Arthropods associated with apple may for convenience be divided into three groups, (a) the injurious phytophagous species, (b) the true parasites and predator species, and (c) those conveniently described as neutral species.

Time will not permit discussion of all the species associated with the unsprayed apple orchard, but reference will be made to some of the more important harmful and beneficial species (Wigglesworth 1960).

HARMFUL SPECIES ASSOCIATED WITH THE UNSPRAYED APPLE ORCHARD

DERMAPTERA: *Forficula auricularia* L.

THYSANOPTERA: *Thrips angusticeps* Uzel.

HEMIPTERA-HETEROPTERA: *Plesiocoris rugicollis* (Fall.) (Apple Capsid Bug), *Lygocoris pabulinus* (L.).

HEMIPTERA-HOMOPTERA: *Rhopalosiphum insertum* (Wlk.) (Apple-grass Aphid), *Aphis pomi* (Deg.) (Green Apple Aphid), *Sappaphis mali* Ferr. (Rosy Apple Aphid), *S. devector* (Wlk.) (Rosy Leaf-curling Aphid), *Eriosoma lanigerum* (Hausmann) (American Blight or Woolly Aphid), *Psylla mali* (Schmidberger) (Apple Sucker); *Lepidosaphes ulmi* (L.) (Mussel Scale), *Eulecanium coryli* L. (Nut Scale), *Aspidiotus ostreaeformis* Curt. (Oystershell Scale), *Typhlocyba froggatti* Baker, *T. rosae* (L.), *Erythroneura alneti* (Dahlbom), *Cercopis vulnerata* Germ.

LEPIDOPTERA: *Macrolepidoptera* species including *Operophtera brumata* (L.), *Alsophila aescularia* Schiff., *Erannis defoliaria* (Clerk), *Malacosoma neustria* L., *Zeuzera pyrina* L., *Chloroclystis rectangulata* L., *Orgyia antiqua* L., *Aegeria myopaeformis* Borkh., *Cossus cossus* L., *Orthosia incerta* Hufn., *Gastropacha quercifolia* L., *Euproctis similis* Fuess. *Microlepidoptera* species including *Archips (Cacoecia) oporana* (L.), *Batodes (Ditula) angustiorana* Haw., *Spilonota ocellana* (Schiff.), *Pandemis heparana* (Schiff.), *Laspeyresia pomonella* (L.) (Codling Moth), *Yponomeuta malinella* (Zell.), *Argyresthia conjugella* Zell., *Blastodacna atra* (Haw.), *Lyonetia clerckella* (L.), *Coleophora anatipennella* Hübner., *C. nigricella* (Steph.), *Simaethis (Anthophila) pariana* (Clerck).

COLEOPTERA: *Melolontha melolontha* (L.), *Otiorrhynchus singularis* (L.), *Phyllobius oblongus* (L.) (Brown Leaf Weevil), *P. argentatus* (L.) (Green Leaf Weevil), *Anthonomus pomorum* (L.) (Apple Blossom Weevil), *Cuenorhinus aequatus* (L.) (Apple Fruit Rhynchites), *Anisandrus dispar* (F.), *Scolytus rugulosus* (Ratz.).

HYMENOPTERA: *Hoplocampa testudinea* (Klug) (Apple Sawfly).

DIPTERA: *Thomasiniana oculiperda* (Ruebsaamen).

ACARINA: *Panonychus ulmi* (Koch) (Fruit Tree Red Spider Mite), *Tetranychus urticae* (Koch) (Greenhouse Red Spider Mite), *Aculus schlechtendali* (Nal.), *Bryobia rubrioculus* (Scheuten) (Apple Bryobia Mite).

Among the large number of insects and mites associated with the unsprayed apple orchard the following are regarded as the most important. The Apple Sucker, the Oystershell Scale, the Nut-scale, the Mussel Scale, the Apple-grass Aphid, the Green Apple Aphid, the Rosy Apple Aphid and the Rosy Leaf-curling Aphid; the caterpillars of the Winter Moth group including the Winter Moth, the Mottled Umber Moth and the March Moth. The Codling Moth is another very important pest which has been known in this country for hundreds of years. The American Blight or Woolly Aphid is an important pest that was introduced into this country from America at the beginning of the nineteenth century. The Apple Bryobia Mite is another prevalent pest of the unsprayed orchard—it is invariably present, and on occasions large aggregations build up on the trunks and main branches of ageing trees. On the other hand both the Fruit Tree Red Spider Mite and the Greenhouse Red Spider Mite are frequently present in very small numbers, but never reach pest proportions. Also it is curious that the Apple Capsid Bug formerly regarded as a major apple pest rarely inhabits unsprayed orchards. Amongst the beetles, the Apple Blossom Weevil, the Apple Fruit Rhynchites and the Brown and Green Leaf Weevils are commonly found in unkempt orchards.

PREDACIOUS SPECIES ASSOCIATED WITH THE UNSPRAYED APPLE ORCHARDS

THYSANOPTERA: *Aeolothrips melaleucus* Hal.

HEMIPTERA-HETEROPTERA: *Anthocoris confusus* Reuter, *A. nemoralis* (F.), *A. gallorum-ulmi* (Deg.), *A. nemorum* (L.) *Orius niger* (Wolff), *O. majusculus* (Reuter), *O. minutus* (L.), *O. laevigatus* (Fieb.) *Phytocoris tiliae* (F.), *P. reuteri* Saunders, *P. ulmi* (L.), *Deraeocoris lutescens* (Schilling), *D. ruber* (L.), *Campyloneura virgula* (H.-S.), *Pilophorus perplexus* (Dougl. & Scott), *Blepharidopterus angulatus* (Fall.), *Orthotylus marginatus* Reuter, *O. ochrotrichus* Fieb., *Heterotoma merioptera* (Scop.), *Malacocoris chlorizans* (Panz.), *Psallus ambiguus* (Fall.), *P. variabilis* (Fall.), *Atractotomus mali* (M.-D.), *Plagiognathus arbustorum* (F.) *Campylomma verbasci* (M.-D.).

NEUROPTERA: *Eumicromus angulatus* (Steph.), *Chrysopa carnea* Steph., *Conwentzia psociformis* (Curt.)

COLEOPTERA: *Oligota flavicornis* Boisd. & Lac., *Tachyporus hypnorum* (F.), *Adalia decempunctata* (L.), *A. bipunctata* (L.) *Coccinella septempunctata* L., *Exochomus quadripustulatus* (L.), *Stethorus punctillum* Weise, *Xylodrepa quadripunctata* (L.).

DIPTERA: *Feltiella tetranychii* Reubsamen, *Arthrocnodae wissmanni* Kief., *Syrphidius (Syrphus) ribesii* (L.), *Scaeva pyrastrii* (L.).

ACARINA: *Allothrombium fuliginosum* Herm., *Anystis agilis* Banks., *Typhlodromus pyri* (Sch.) *T. finlandicus* Oud., *T. masseei* Nes., *Phytoseius spoofi* Oud.

ARACHNIDA: All the true spiders are predacious, but only those contained in the families THERIDIIDAE and LINYPHIIDAE and in particular *Theridion pallens* Bl. have been noted.

Fifty species of predacious insects and mites have been recorded in the unsprayed apple orchard, of which half are represented by the Hemiptera-Heteroptera. The latter belong to the families MIRIDAE and ANTHOCORIDAE, and include some of the most important species associated with fruit. They are *Blepharidopterus angulatus* (Fall.), *Psallus ambiguus* (Fall.) and *Anthocoris nemorum* (L.). These three species prey upon many pests including the Fruit Tree Red Spider Mite, and are present in both sprayed and neglected orchards, but are more plentiful in the latter.

The Coleoptera are also important, and three species, namely, the Two- and Seven-spot Ladybird Beetles, and the minute black ladybird, *Stethorus punctillum* Weise, feed on all stages of aphids and phytophagous mites. The most important Acari are *Typhlodromus finlandicus* Oud., and *Anystis agilis* Banks, that prey upon the Fruit Tree Red Spider Mite and the eriophyid mites found on apple.

It must be emphasised that in the unsprayed orchard there is a continuous succession of beneficial species throughout the year, and when the active forms of phytophagous insects are not available as prey

during the winter months, the predators feed on the overwintering eggs, scale insects and the hibernating larvae of tortricid species.

Before spraying became a general practice in both commercial and neglected orchards, the trees housed the same kinds and population densities of insects. Fruit growers mainly relied upon ducks, geese or poultry to eradicate their pests, plus the annual grease banding of the trees in the autumn which was the fashion of the day. In addition some of the larger standard trees were pruned, but general orchard hygiene was only conducted on a small scale.

The first real changes in the fauna and population density of the commercial apple orchard followed the introduction from Holland of the hydrocarbon oil or tar oil winter wash, which was first used in this country in 1921. The marked effectiveness of this new winter wash became strikingly apparent when the eggs of many serious apple pests failed to hatch in the spring months. Some of the most important pests which were completely eliminated were the Mussel Scale, the Oyster-shell Scale, the Nut Scale, the Apple Sucker, the Apple-grass Aphid, the Rosy Apple Aphid, and the Rosy Leaf-curling Aphid; while some control was obtained of the three injurious Winter Moth species and the Woolly Aphid.

Many unsprayed apple trees support epiphytic plants, mosses and the unicellular green alga, *Pleurococcus* sp. The tar oil washes removed these foreign growths as well as most of the loose bark from the tree trunks. This new winter wash caused an unexpected effect on the fauna. Those species that normally hibernated under loose bark were killed by the Winter wash or moved away to find more suitable winter quarters (Massee 1952). Amongst other species affected was the predacious bug, *Anthocoris nemorum* (L.). In fact, the absence of several species of anthocorid bugs was noteworthy in the spring months. However, the next generation of these bugs returned to the orchard again in the late summer, dispersing from the adjacent hedgerows, only to be wiped out again the following winter.

The tar oil winter washes were toxic to so many noxious insects that the fruitgrower applied them each winter as a matter of routine. After some years, however, it was found that large populations of the Fruit Tree Red Spider Mite were building up in orchards where winter washes were used each season (Lord 1949). Indeed by 1930 the Fruit Tree Red Spider Mite proved to be one of the most important fruit pests in commercial orchards in the south-east of England, and remains so to-day.

Many hypotheses have been advanced to account for the increase of the mite. The facts are as follows. First it was found that the overwintering eggs of the mite were not killed by the tar oil winter wash. And as already stated the anthocorid bugs which normally hibernate on the trees were killed or dispersed elsewhere following the winter wash application. The ladybird beetles and the minute predacious mites were also affected, so when the eggs of the Fruit Tree Spider Mite

hatched in the spring, the immature stages fed on the foliage without being preyed upon by beneficial insects and mites.

The next notable change in the fauna occurred when the Apple Capsid Bug, *Plesiocoris rugicollis* (Fall.) increased in enormous numbers in commercial orchards and became a major pest. The Apple Capsid Bug was originally associated with *Salix* spp. and *Myrica gale* L. and was first recorded feeding on apple at Wisbech, Cambs., in 1917. By 1926 this bug had spread to most fruitgrowing districts of England, the exceptions being a few orchards in the Tenterden district of Kent and the whole of Essex except the Colchester district. There appears to be no explanation why the capsid did not infest the Tenterden and Essex orchards.

It is noteworthy that the Apple Capsid Bug is never common in unsprayed orchards, if indeed it ever occurs there, and the few published records may well refer to other species of mirids, some of which are similar to the Apple Capsid Bug in their immature stages.

The fact that the immature bugs fed on the young fruitlets, distorting them and rendering them unsaleable, brought a crisis to the industry.

The fact that the capsid bug and the mite were the two most serious apple pests led to a further modification of the spray programme by largely replacing the tar oil winter wash by the introduction of petroleum oil and the DNC/petroleum wash. The new winter wash was applied to kill the winter eggs of the capsid bug and of the mite, and the DNC which was usually used with an admixture of petroleum, and applied at the delayed dormancy period of fruit development, to control aphids and Apple Sucker. However, in spite of these new washes the problem of capsid and mite control became more urgent.

Undoubtedly the most striking changes in the fauna of the apple orchard were brought about in 1946 and 1947, following the introduction of the chlorinated hydrocarbon insecticides (Ripper 1956). Both DDT and BHC were available in several formulations, and these synthetic chemicals reduced still further the number of important pests present in the apple orchard, such as the Apple Capsid Bug, Apple Blossom Weevil, the Apple Aphids, Apple Sawfly and gave moderate control of the populations of the Winter Moth group, tortricid caterpillars and Codling Moth.

Unfortunately it was soon discovered that DDT and to a lesser degree BHC were toxic to most beneficial insects, and many species were eliminated from commercial orchards when these chemicals were used as post-blossom sprays (Pickett 1955; Hinton 1955).

However, the progressive fruitgrower soon appreciated the limitations of both DDT and BHC since following their introduction mite populations were continuing to build-up in Kentish and Eastern Counties orchards.

In a further endeavour to control the mite the organophosphorus chemical parathion was added to the spray programme. This spray was applied twice post-blossom (at the fruitlet stage) causing a marked

reduction of the mite population. However, by the end of July large mite populations were building up again—and the mite problem was as serious as ever. In a determined effort to wipe out the mite a few fruitgrowers applied three, four or even five applications of parathion, only to find an even greater mite population build-up in late summer. In addition a second species of phytophagous mite, *Tetranychus urticae* (Koch) increased to pest proportions, and added to the harm already caused to the trees by the Fruit Tree Red Spider Mite.

In 1953 and 1954 further modifications of the spray programme had a marked effect upon the orchard fauna. The introduction of the chemicals, chlorfenson and fenson, so-called summer ovicides, were very welcome since they were not related to the organophosphorus chemicals. These new sprays proved toxic to the eggs and immature stages of the mite, and also killed some of the mature forms. Indeed, these sprays were so efficient that for a few years the mite was no longer regarded as a pest in orchards where efficient spraying was practised. In addition these summer ovicides did not harm many beneficial insects.

By the latter part of 1958 fruitgrowers were complaining that the summer ovicides were no longer providing adequate control of the mite, and high populations were building-up again in Kent and Essex orchards. In fact this phenomenon was the first indication of mite resistance to these summer ovicides which is now an accepted fact in Kent and Essex orchards. As a result the summer ovicides are rarely used to-day to eradicate the mite. Now the grower has returned to the use of organophosphorus chemicals and systemic pesticides and many other new chemicals which appear as regularly as clockwork each year.

In spite of the continued influx of new organophosphorus chemicals of various formulations and of other new pesticides, the official recommendations are not adequate, since high mite populations still build up in orchards in the late summer, when it is too late in the season to apply further sprays.

In fact in the Eastern Counties alone there are 17 authentic examples where mites are known to be resistant to organophosphorus chemicals. Positive mite resistance to these chemicals has not been noted in Kent, but it may well be that the 'writing is on the wall', and in a year or two the mite problem may be as serious again as it was in the years prior to World War II.

During all these years the spraying machine manufacturers have not been idle, and to-day, innumerable up-to-date mobile appliances are available for rapid application of sprays. The new machines include the autoblast, the low-volume appliances and those used for applying chemicals in a concentrated form. The machines have proved a boon to the fruit grower on account of the considerable saving in labour, and their capability of spraying large acreages each day, and not least the conservation of water since some modern machines use as little as thirty gallons per acre.

One of the chief objections to these modern machines is the problem of spray drift, for in addition to spraying the orchards in inclement weather, the spray may drift through the hedgerow on to adjacent property. Most growers endeavour to minimise spray drift as much as possible by spraying only when weather conditions are suitable, but in some seasons this is difficult to achieve if the spray is to be applied at the correct time.

Another important factor must be taken into account when assessing the populations of the orchard fauna, namely the hedgerow that surrounds the orchard. Large populations of beneficial, pollinating, parasitic and neutral insects and mites have their headquarters in the hedges and rough grass at their base, and from these sites many beneficial insects disperse into the orchards and help in keeping down pest populations. The drift of noxious chemicals from the mobile machines greatly reduces the populations of the hedgerow as well as the insects on the headland adjacent to the hedge.

Still more alarming is the wholesale destruction of hedges which is being practised to-day. On many fruit farms the hedges are grubbed, and are being replaced by unsightly wire-netting and posts to mark the boundary. The ruthless destruction of the heritage of the countryside is accepted because certain petty officials state that certain species of plants growing in the hedges are carriers of 'fire-blight' an important disorder of certain varieties of pear.

In the days before the routine spraying of orchards was practised about 80 potential pests were associated with the so-called 'commercial orchard', and not infrequently the ravages of these insects defoliated the trees. To-day the situation has changed considerably, and the number of important pests of apple number about six, of which the Fruit Tree Red Spider Mite, the Codling Moth, the Aphid species, the tortricid moths, the Woolly Aphid and a comparatively new apple pest, the Apple Bryobia are the most serious. It is rather ironical when one reflects that the number of important apple pests has been reduced from 80 to about half a dozen, and those remaining to-day may prove as serious as the numerous species of former days. This state of affairs is still more unpalatable when one notes the continued flooding of the market with new pesticides, the introduction of new spraying equipment, and not least the greater knowledge available of the habits of fruit pests, and more accurate information regarding the timing of sprays for their destruction. A ban on the introduction of new chemicals until they have been tested from all angles may well be the answer to this vexed problem.

There is another very important aspect of this problem which must not be overlooked. Now it has become the fashion to apply organophosphorus chemicals as pre-blossom sprays, the influence of the economic entomologist must be used to ensure that these noxious chemicals are not applied later than the 'green cluster' stage, or at the very latest at least ten days before the blossom period. That this advice is followed is imperative because if applications are made at the 'pink

bud' stage or just prior to the blossom period, pollinating, beneficial, parasitic and neutral insects will be destroyed as well as any pests present in the orchard. Further, and probably more important, a fact often not appreciated by the fruitgrower or indeed many economic entomologists is that in addition to the destruction of the fauna resident in the orchard, those beneficial species attracted to the orchard during the blossom period from the hedgerow, nearby woodlands, and the surrounding districts, are also killed. Much harm may not occur by ruthless spraying in any one season, but if practised year after year the effect on pollination may prove very serious.

After over 40 years experience in relation to the control of fruit pests it is clear to the writer that the use of chemicals alone will not provide the answer to the problem. What is needed is a team of research workers, including ecologists, entomologists, pathologists, bio-assay biologists and chemists to study the problem in detail. A long-term programme should be drawn up by qualified members of these specialists. Some of the subjects to be studied might include a comprehensive study of the orchard fauna, including the pests, beneficial, parasitic, neutral and pollinating species and the study of chemicals with specific reference to the production of selective chemicals (both insecticides and fungicides). A short term research project should be undertaken with a view to using selective chemicals, thus ensuring a build up in the orchard of beneficial species which are essential to the balance of the fauna of the orchard (Massee 1958; Kuenen 1958).

It must be emphasised again that such a programme of research must be drawn up by specialists familiar with the implications envisaged in such a project, and not by administrators or Heads of Departments, solely interested in the chemical control of pests.

Finally, this Address has been written in an endeavour to illustrate to the reader some of the pitfalls encountered while attempting to control fruit pests by chemicals. It would be an understatement to say the battle has been won.

To-day potent chemicals are being applied against horticultural pests, in agriculture, in forestry, as weed-killers and to roadside verges. Also chemicals are used against pests of heaths and commons, and even against mosquitoes and midges of our wayside ponds. And now we are informed that chemicals are likely to be used to control weeds which are choking up some of the waterways of the Norfolk Broads.

Broadminded naturalists and entomologists everywhere must be very apprehensive of the future, and it is hoped that the powers that be are equally awake to the dangers of this folly before it is too late.

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FIELD MEETINGS, 1961.

NEWLANDS CORNER, SURREY—15th April 1961.

Leader: Mr. F. M. STRUTHERS.

A party of 13 members and friends attended this, the first field meeting of the season. From Clandon Station the party was fortunate enough to have transport to the top of Newlands Corner. The day was fine and sunny with temperatures in the upper fifties and with a variable light breeze.

The party worked along the top edge of the hill through the woodland paths, and after lunch, the lower chalk slopes.

Soon after starting some fine specimens of the mycetozoan *Lycogala epidendrum* Fr. were found on a fallen log. Three stages were present, i.e., the red plasmodium, young pink aethalia and older brown ones. Alongside the track were plants of *Adoxa moschatellina* L. (Moschatel or Townhall Clock), with five flowers, one pointing upwards and the others on a level and pointing in each of the four directions; hence the second English name. The track was much churned up by horses, and in compensation, and no doubt arising from the horse droppings, there were some examples of the fungus *Bolbitius vitellinus* (Pers.) Fr.

As the party turned downhill after lunch, the moss *Pseudoscleropodium purum* (Hedw.) Fleisch. was noted in great abundance and there were big patches of *Mnium affine* Bland and beautiful clumps of *Fissidens adianthoides* Hedw.

Many spring butterflies were on the wing, including freshly emerged specimens of *Pieris rapae* L., *P. napi* L., *Anthocharis (Euchloe) cardamines* L. and *Pararge aegeria* L., as well as hibernated *Gonepteryx rhamni* L., *Polygonia c-album* L. and *Nymphalis io* L.

Amongst larvae found were *Arctia villica* L., *Oidaematophorus carphodactyla* Hübn., *Elachista magnificella* Tengst. and larvae and pupae of *Plutella (Ypsolophus) porrectella* L. Stems of *Viburnum lantana* L. (Wayfaring Tree) were searched and those with evidence of workings of the clearwing larva *Aegeria andrenaeformis* Lasp. were collected.

Other imagines noted during the day were: *Lampropteryx suffumata* Schiff., *Anticlea (Coenotephria) derivata* Schiff., *Eupithecia nanata* Hübn., *Schreckensteiniella festaliella* Hübn., *Laspeyresia ulicetana* Haw., *Grapholita jungiella* L. (*Laspeyresia perlepidana* Haw.), *Antispila treitskiella* F. R., *Pancalia leuwenhoekella* L., *Elachista rufocinerea* Haw., *Ornix fagivora* Staint. and *Adela viridella* Scop.

The trek to the station after tea was interrupted to inspect a White Beam tree on which were many plants of mistletoe.

CHILWORTH, SURREY—23rd April 1961.

Leader: Mr. S. WAKELY.

Meeting at Chilworth station, the party proceeded southwards to the extensive heathlands of Black Heath. The weather was bright and sunny and the few butterflies seen included *Anthocharis* (*Euchloe*) *cardamines* L., *Pararge aegeria* L. and *Celastrina argiolus* L. Moths noted were *Drepana falcatoria* L., *Cynia mendica* Clerck, *Anarta myrtili* L., *Cosymbia albipunctata* Hufn., *Aethalura punctulata* Schiff. and *Gelechia velocella* Dup. The last named species was fairly common in one small area. A single specimen of *Roeslerstammia erxlebelli* F. was also taken.

Lunch was taken on the higher ground with a good view of the country stretching away to Farley Heath in the distance. In the afternoon the activities were chiefly confined to beating the birch trees for larvae, when the following species were taken: *Achlya flavicornis* L., *Amathes castanea* Esp., *Geometra* (*Hipparchus*) *papilionaria* L., *Oporinia autumnata* Borkh., *Perconia strigillaria* Hüb., *Ellopia fasciaria* L., *Campaea margaritata* L., *Salebria* (*Phycita*) *betulae* Deg., and *Coleophora ibipennella* Zell. (*betulella* auct. nec Hein & Wocke). Larvae of *Rhyacionia* (*Evetria*) *buoliana* Schiff. on pine were also found.

The following botanical notes were supplied by Mr. T. R. Eagles:—

A feature of the heathy ground was the abundance and beauty of the lichens. There were innumerable plants of *Cladonia coccifera* (L.) Willd. with bright red apothecia like sealing wax on the margins of the cups. Also conspicuous were grey masses of the so-called Reindeer Moss. This is in fact a lichen, and though very like that eaten by the deer, is another species, *Cladonia impepa* Harm. There was also *C. sylvatica* Hoffm. Almost every dead twig was adorned with the grey rosettes of *Hypogymnia physodes* (L.) Wats.

The mosses *Polytrichum juniperinum* Hedw. and *P. piliferum* Hedw. were growing vigorously where there had been fire. The male "inflorescences" were most noticeable; capsules seemed comparatively scarce. Another abundant moss was *Dicranum scoparium* Hedw. By the side of a ditch were patches of the liverwort, *Lunularia cruciata* (L.) Dum., with the little moon-like ridges full of gemmae.

The only fungus of note was *Boletus variegatus* (Swartz) Fr.

At about 4.30 p.m. those present converged on the local inn, "The Volunteer", where a welcome tea was enjoyed by all.

OTFORD, SURREY—30th April 1961.

Leader: Mr. E. E. J. TRUNDELL.

This meeting was held jointly with the Kent Field Club and was well supported. A total of 21 people attended.

The day was fine and warm, but a fresh breeze kept the somewhat exposed hillside free from flying insects. The only butterflies reported being a few "whites", a single *Anthocharis cardamines* L. and a few *Pararge aegeria* L.

The hillside has many beautiful flowering plants, perhaps the most interesting being the two species of milkwort, *Polygala vulgaris* L. and *P. calcarea* F. Schultz. In the woods at the top of the hill were examples of the Spurge Laurel (*Daphne laureola* L.) and the Early Purple Orchis (*Orchis mascula* L.).

On the fringe of an adjacent cornfield the identification of Corn Gromwell (*Lithospermum arvense* L.) caused considerable dispute; and on a damp spot by the roadside the moss *Physcomitrium pyriforme* Hedw. was found with many spore capsules.

Tea was taken at the Old Oat House, Otford.

The following Lepidoptera were recorded: *Euclidimera mi* Clerck, *Ectypa glyphica* L., *Phytometra viridaria* Clerck, *Lomaspilis marginata* L., *Bapta bimaculata* F., *Lithina chlorosata* Scop., *Grapholita jungiella* L. (*Laspeyresia perlepidana* Haw.), *Elachista argentella* Clerck (*cygnipennella* Hübn.), *Incurvaria masculella* F., *Adela viridella* Scop. and *Nemophora swammerdamella* L. The larvae noted were: *Hemistola immaculata* Thunb., *Europhila badiata* Schiff., *Eana incanana* Steph., *Depressaria nanatella* Staint., *Coleophora gryphipennella* Bouch., *C. olivacella* Staint. and *Apamea scolopacina* Esp.

DEAL, KENT—7th May 1961.

Leader: Mr. M. G. MORRIS.

The weather was fine, but with a strong breeze blowing, at the Society's meeting in this famous locality, held jointly with the Kent Field Club. The sands along the shore from Sandgate Castle to the Royal Guildford Hotel were worked.

Lepidoptera were not numerous, but the following were recorded: *Aricia agestis* Schiff., several; *Euproctis chrysorrhoea* L., larvae in webs on Sea Buckthorn; *Phragmatobia fuliginosa* L., a single example; *Mesotype virgata* Hufn., several; *Aspitates ochrearia* Rossi; *Phalonia atricapitana* Steph.; *Coleophora lineola* Haw., larvae on *Ballota nigra* L.; *C. discordella* Zell., larvae on *Lotus corniculatus* L.; *Gracillaria tringipennella* Zell., a single example.

Rather few Hemiptera (Heteroptera) were found, but they included some interesting species: *Odontoscelis fuliginosa* (L.), *Eurygaster maura* (L.), *Podops inuncta* (F.), *Sciocoris cursitans* (F.), *Megalonotus praetextatus* (H.-S.), *M. chiragra* (F.), *Trapezonotus arenarius* (L.), *Beosus maritimus* (Scop.) a single example, *Anthocoris nemorum* (L.), *A. confusus* Reuter.

Some local Coleoptera were taken. The species represented were: *Dyschirius globosus* (Herbst), *Bembidion assimile* Gyll., *Panagaeus*

bipustulatus (F.) a single example, *Harpalus anxius* (Dufts.), *Amara spreta* Dej., *A. tibialis* (Payk.), *Pterostichus vernalis* (Panz.), *Agonum marginatum* (L.), *Metabletus foveatus* (Fourc.), *Phylan gibbus* (F.), *Melanimon tibiale* (F.), *Opatrum sabulosum* (L.), *Crypticus quisquilius* (L.) a single pupa, *Aphodius plagiatus* (L.), *Apion marchicum* Herbst, *A. sedi* Germ. at the roots of *Sedum* spp., *A. malvae* (F.), *A. aeneum* (F.), *A. radiolus* Kirby, *A. loti* Kirby, *A. ononis* Kirby, *Otiorrhynchus oratus* (L.), *O. atroapterus* (Deg.) unusually scarce, *Trachypphoeus scabriculus* (L.), *Phyllobius virideaeris* (Laich.), *Philopodon plagiatus* (Schall.) abundant, *Sitona grisea* (F.), *Limobius mixtus* (Boh.) three under *Erodium* spp., *Ceuthorhynchidius troglodytes* (F.), *Mecinus pyraister* (Herbst) and *Tychius tibialis* Boh.

WHIPPENDELL WOOD, HERTS.—13th May 1961.

Leader: Mr. B. GOATER.

It was disappointing that on such a fine sunny day only five people assembled with the leader at Watford Metropolitan Line Station. The party made its way first to the marshy woodland alongside the canal at the bottom of Cassiobury Park, thence working across the golf course to Whippendell Wood in which the afternoon was spent.

There was a dearth of insects in all stages. In particular, the larvae of *Eupithecia inturbata* Hübn. were sought, but the maple flowers were already over and not a larva was seen. Similarly, the wych elms, which can usually be relied upon to yield quantities of interesting larvae at this season, produced but three, *Strymonidia w-album* Knoch, and a few *Agrochola circumcellaris* Hufn. and *Eupsilia transversa* Hufn.

A handful of Lepidoptera were seen on the wing. The most interesting were some *Adaina microdactyla* Hübn., which appeared to be associated with a single small patch of Hemp Agrimony by the canal. Quantities of *Glyphipterix fischeriella* Zell. were flying over patches of Speedwell. Other Lepidoptera included *Pieris brassicae* L., *Nymphalis io* L., *Pararge aegeria* L., *P. megera* L., *Coenonympha pamphilus* L., *Scopula lactata* Haw. (*floslactata* Haw.), *Epirrhoe alternata* Müll., *Eupithecia vulgata* Haw., *Bapta temerata* Schiff., *Deilinia (Cubera) pusaria* L., *Pseudopanthera macularia* L., *Lithina chlorosata* Scop., *Aethalura punctulata* Schiff., *Anthophila fabriciana* L., *Aethes (Phalonia) smeathmanniana* F. and *Eulia ministrana* L.

One plant of *Ornithogalum umbellatum* L. (Star of Bethlehem) in flower was found by the canal.

Two members of the party concentrated on the Bryophyta, a group rarely studied on our field meetings, and about three dozen species were recorded. These included *Tortula muralis* Hedw. (*eum fructu*), *Bryum capillare* Hedw. (*eum fructu*), *B. argenteum* Hedw., *Eurhynchium riparioides* (Hedw.), *E. praelongum* (Hedw.), *E. confertum*

(Dicks.) (*cum fructu*), *Hygrohypnum luridum* (Hedw.) (*cum fructu*), *Brachythecium rutabulum* (Hedw.), *Aulacomnium androgynum* (Hedw.) (*cum gemmis*), *Mnium hornum* Hedw. (*cum fructu*), *M. affine* Bland., *M. undulatum* Hedw., *Dicranum scoparium* Hedw., *Dicranella heteromalla* (Hedw.), *Campylopus* spp., *Hymn. cupressiforme* Hedw., *Funaria hygrometrica* Hedw. (*cum fructu*), *Atrichum undulatum* (Hedw.), *Fissidens taxifolius* Hedw., *F. bryoides* Hedw., *F. crassipes* Wils., *Thuidium tamariscinum* (Hedw.), *Polytrichum formosum* Hedw., *P. gracile* Sm., *Amblystegium serpens* (Hedw.) (*cum fructu*), *Fontinalis antipyretica* Hedw., *Pohlia nutans* (Hedw.) (*cum fructu*), *Brachythecium populeum* (Hedw.), *Orthodontium lineare* Schwaegr. (*cum fructu*), *Leptodictyum riparium* (Hedw.) (*cum fructu*), *Cirriphyllum piliferum* (Hedw.), *C. crassinerrum* (Tayl.) and *Ceratodon purpureus* (Hedw.). The liverworts *Lunularia cruciata* (L.), *Lophocolea heterophylla* (Schrad.) and *Scapania curta* (Mart.) were also noted.

CHALLOCK WOODS, KENT—21st May 1961.

Leader: Dr. E. Scott.

The terrain is included in the Challock State Forest, planted in squares with conifers (larch, spruce, pine, etc.), and also beech and chestnut. The rides are wide enough to take cars, acting partly as fire breaks, with grass verges, which also contain many flowering plants.

The day was bright with a very cold north-east wind. About 20 people attended, including members of the Kent Field Club in conjunction with whom the meeting was held. The party proceeded to the woods by cars, which were parked in a central place near a large static water tank, well inside the woods, which formed a convenient place for lunch. Four rides met at this point providing different routes to explore. Most of the party proceeded towards Godmersham, where much of the collecting was done in a rough grassy area with a lot of scrub. Here *Hamearis lucina* L. was fresh and common, providing many opportunities for photography. There were not many insects on the wing, but the spruces were buzzing with the little tortricid *Epinotia* (*Eucosma*) *tedella* Clerck in mint condition. A few plants of interest were found, including colonies of *Orchis purpurea* Huds., *Lithospermum officinale* L., *Aquilegia vulgaris* L., and the handsome grass *Calamagrostis epigejos* (L.) Roth. Near the static water tank a large colony of *Sedum telephium* L. was coming up.

Lepidoptera reported were: *Pieris napi* L., *Coenonympha pamphilus* L., *Pararge megera* L., *Hamearis lucina* L., *Pyrgus malvae* L., *Erynnis tages* L., *Euclidimera mi* Clerck, *Xanthorhoe montanata* Schiff., *Pseudopanthera macularia* L., *Lyncometra ocellata* L., *Epirrhoe alternata* Müll., *Ematurga atomaria* L., *Deilinia* (*Cabera*) *pusaria* L., *Epichnapteryx pulla* Esp., *Pyrausta* (*Anania*) *funebria* Stroem., *Olethreutes* (*Argyroproctus*) *lacunana* Dup., *Epinotia* (*Eucosma*) *tetraquetra* Haw.

(*triquetrana* Haw.), *E. tedella* Clerck, *Ancyliis obtusana* Haw., *Phalonia nana* Haw., *Lathronympha strigana* F. (*hypericana* Hübn.), *Pseudargyrotoza conicagana* F., *Incurvaria mascolella* F.; *Elachista argentella* Clerck (*cygnipenella* Hübn.), *Nemophora swammerdamella* L., *Dasycera sulphurella* F., *Antispila treitschkiella* F. R., and *Glyphipterix fischeriella* Zell.

Tea was provided in a bungalow at Challock by the kindness of Mrs. E. Scott and Miss G. Lester. In the garden of the bungalow was a large variegated holly where shoots were infected by the larvae of the tortricid *Rhopobota* (*Acroclita*) *naevana* Hübn.

EFFINGHAM, SURREY—27th May 1961.

Leader: Mr. T. R. EAGLES.

Seven members attended; an eighth came late and missed the party. Mostly the weather was threatening and there was one slight shower.

Barnsthorpe Wood was worked. There was little on the wing and lepidopterous larvae were not plentiful. Almost the only imago of note was *Acrolepia granitella* Treits. *Lomaspilis marginata* L. was seen. The following species were noted in the larval stage: *Achlya flavicornis* L., *Orthosia populeti* F., *O. munda* Schiff., *Archicaris notha* Hübn., *Hydriomena furcata* Thunb., *Eupithecia abbreviata* Steph. and *Epinotia nisella* Clerck.

Much time was devoted to searching for the larval cases of *Coleophora palliatella* Zinck. About a dozen were found but no moths resulted. Towards the end of the day plants of *Chrysanthemum leucanthemum* L. growing on the railway bank were examined for tortricid larvae in the stems and a few were found.

The Nightingale was heard and it was thought that a Cuckoo was calling in the distance. It was clearly a poor year for the latter bird.

It was noticed that almost everywhere the young tips of bracken were "scorched"—either by frost or dry winds. One small patch of the flowering plant *Serratula tinctoria* L. was seen.

Mosses and liverworts were studied and many species found, including the mosses *Pleuridium acuminatum* Lindb. and *Bryum pseudotriquetrum* (Hedw.) Schwaegr. and the liverwort *Calypogeia fissia* (L.) Raddi.

Some specimens of the fungus *Pholiota praecox* (Pers.) Fr. were seen.

Tea is no longer served at the shop near the station.

WOOD WALTON FEN, HUNTS.—4th June 1961.

Leader: Mr. F. G. SMITH.

By courtesy of the Nature Conservancy the Society visited this reserve for the first time. Several members travelled up during the previous afternoon to run lamps over sheets or in traps on Saturday

Mr. A. Gardner working drain 5 at Wood Walton Fen for water beetles.



Mr. A. Price working for *Hydradephaga* at Bentfleet.

night. Both mercury vapour lamps, run from portable generators, and paraffin pressure lamps were used.

The evening was mild (force one wind with temperatures in the upper sixties—some 19°C.) and humid, but few insects took wing at dusk. *Orthotaenia undulata* Schiff. (later one of the most abundant of the Lepidoptera at light) and *Apotomis pruniana* Hübn. were seen. Slugs, earwigs and millipedes were the chief visitors to sugar, the only moths being *Scoliopteryx libatrix* L. and *Dypterygia scabriuscula* L.

The lights proved disappointing and few new species were seen after the first hour of running. There were few fenland species in the catch and flies were little more plentiful than moths. Two *Perinephela perlucidalis* Hübn. were by far the most notable visitors. *Elachista cerusella* Hübn. was undoubtedly the most common moth at light, but few other micros were seen. Mr. P. J. Baker remarked that all the *Biston betularia* L. which he saw were melanic.

The sun shone only fitfully on the Sunday, but the day was warm enough. Few insects were on the wing and everyone commented how few insects could be beaten. The most common macro moth larva seemed to be that of *Lygris testata* L. Vigorous sweeping produced only a handful of insects in the bottom of the net.

The Copper field was swept for *Perinephela perlucidalis* Hübn. without success and only one *Ethmia funerella* F. could be flushed from the comfrey in the process.

Mr. Wakely took larvae of *Aristotelia morosa* Mühl. (previously recorded only from Wicken Fen, Cambs.) and *Cnephasia interjectana* Haw. in spun shoots of Yellow Loosestrife (*Lysimachia vulgaris* L.), *Gelechia sororecullella* Hübn. and *Anacampsis populella* Clerck in spun shoots of willow. Moths of *Lampronia praelatella* Schiff. were seen. Meyrick gives only *Fragaria* as the foodplant of this species, but *Filipendula ulmaria* (L.) Maxim., far more likely here, is given in *Ent. Ann.*, 1856: 49.

Two coleopterists, Mr. F. D. Buck and Mr. A. E. Gardner, worked the drains throughout the day for aquatic Coleoptera with moderate success and give the following list: *Haliphus ruficollis* (Deg.), *H. lineatocollis* (Marsh.), *H. wehnckeii* Gerh., *Hydroporus memnonius* Nic., *H. planus* (F.), *H. melanarius* Sturm., *H. pictus* (F.), *Hyphydrus ovatus* (L.), *Dytiscus dimidiatus* Bergstr., *D. marginalis* L., *Rantus exsoletus* Forst., *Ilybius fenestratus* (F.), *Laccophilus minutus* L., *Laccobius striatulus* (F.) (*nigriceps* Thomson), *Anacaena limbata* (F.), *Helophorus minutus* F. (*affinis* (Marsh.)), *Hydrobius fuscipes* (L.), *H. niger* (Zsch.), *Helochaeres lividus* (Forst.) (*griseus* (F.)), *Enochrus testaceus* F., and *Dryops luridus* Er. In addition to the aquatic Coleoptera *Chrysolina polita* (L.) was noticed once or twice sitting about on the vegetation in various parts of the fen. Mr. Wheeler whilst working for Lepidoptera beat a single example of *Athous haemorrhoidalis* (F.) on drove 5, and a single example of *Phyllobius virideaeris* (Laich.), also on drove 5. Both these beetles are quite common and would be expected by beating in any part of the fen at this time of the year.

Lepidoptera recorded at light were: *Notodonta ziczac* L., *N. dromedarius* L., *Pterostoma palpina* Clerck, *Pheosia tremula* Clerck, *Lophopteryx capucina* L., *Dasychira pudibunda* L., *Deilephila elpenor* L., *Eumichtis adusta* Esp., *Apatele megacephala* Schiff., *Axylia putris* L., *Hadena thalassina* Hufn., *Diarsia rubi* View., *Apamea unanimitis* Hübn., *Procus fasciuncula* Haw., *Lithacodia fasciana* L., *Arenostola extrema* Hübn., *Lobophora halterata* Hufn., *Eupithecia centaureata* Schiff. and *Biston betularia* L.

This was a disappointing first visit, both for the Society and for the Nature Conservancy who hope to gain information on the fauna from such meetings. The fen vegetation hid its inmates well that day, but we hope to return on a more propitious occasion.

PRINCES RISBOROUGH, BUCKS.—10th June 1961.

Leader: Mr. F. G. SMITH.

In very inclement weather conditions only three members braved this trip into the Chilterns. A few micros were disturbed from the wet undergrowth, and these included one or two crambids, *Phalonia tesserana* Schiff. and *Pempelia dilutella* Hübn. Larvae of *Gonepteryx rhamni* L. were apparent on Buckthorn, and three pupae of *Platyptilia* (*Pterophorus*) *galactodactyla* Schiff. were taken on the underside of burdock leaves.

The small party decided by mid-afternoon that they had had enough.

GROOMBRIDGE, SUSSEX—18th June 1961.

Leader: Mr. J. M. CHALMERS-HUNT.

Ten people attended this meeting which was blessed with fine weather; there being a fair amount of sun, the temperature was rather warm, and there was little or no wind. The party proceeded to the Eridge Estate, where on the open heathy ground, now planted with monotonous rows of young conifers, the following Lepidoptera were noted: *Gonepteryx rhamni* L., larvae on *Rhamnus frangula* L.; *Clossiana* (*Argynnis*) *selene* Schiff.; *Macrothylacia rubi* L., large cluster of ova on the topmost shoot of a willow bush; *Cerura vinula* L., ova and larva on willow; *Diaeris* *sannio* L.; *Cybosia mesomella* L.; *Rivula sericealis* Scop.; *Lithina chlorosata* Scop.; *Zygaena lonicerae* von Scheven, plentiful by the roadside, freshly emerged; *Epiblemma* (*Scutulana* f.) *cirsiana* Zell.; *Epinotia tetraquetra* Haw. (*Eucosma triquetra* Haw.); *Amelia riburniana* Schiff., larva on willow; *Coleophora alnifoliae* Barasch, larvae on alder.

After lunch some of the party set off to visit the High Rocks at Tunbridge Wells, Kent, some five miles distant, in the hope of finding the very local *Odezia atrata* L., but were unsuccessful, and very little of

the food-plant, *Conopodium majus* (Gouan.) Lorr. & Barr. (Earthnut), was found. A number of *Pararge aegeria* L. were noted here, and a full-fed larva of *Anthocharis cardamines* L., was found on *Alliaria petiolata* (Beib.) Cavara & Grande (Garlic Mustard). By the stream the conspicuous bright yellow and red spotted flowers of *Mimulus guttatus* DC. (Monkey-flower), made an attractive sight.

Back at Eridge Estate, Mr. T. R. Eagles reported a number of fine plants of *Athyrium filix-femina* (L.) Roth. (Lady Fern), many of which were of the form with a dark reddish stalk and rachis.

ASH VALE, SURREY—24th June 1961.

Leader: Mr. B. F. SKINNER.

Only three members met the leader at the station. Another, who missed the train, joined the party in the late afternoon. The day was continuously sunny and the heat was intense, especially on the open heaths.

Both sexes of *Diacrisia sannio* L. were flushed from the heather, together with a few *Perconia strigillaria* Hübn. and *Pachynemidia hippocastanaria* Hübn. A larva of *Argyrotaenia pulchellana* Haw. (*Eulia politana* Haw.) was also found on the heather.

After lunch the party decided to work the more wooded areas. Here a few larvae of *Drepana falcataria* L. were taken from alder, and two larvae of *Saturnia pavonia* L. were found feeding on *Frangula alnus* Mill (Alder buckthorn), a rather unusual foodplant for this species. Lepidoptera on the wing included: *Plebejus argus* L., *Pararge megera* L., *P. aegeria* L., *Bupalus piniaria* L. and *Ematurga atomaria* L. After an unsuccessful search for *Gracillaria elongella* L. in the alder swamps, the party returned to the station café for refreshments.

BENFLEET, ESSEX—1st July 1961.

Leader: Mr. F. D. BUCK.

It was an exceptionally hot day with no wind at all on which the party of seven proceeded onto the marsh, well behind the sea wall. The locality is poor since the widespread flooding which caused such damage along our south-eastern coast several years ago. At that time most of the shorter cross dykes were silted up and were not re-dug afterwards, they can now be traced only by the shallow depressions in the ground under the turf. The main dyke immediately behind the sea wall was efficiently re-dug, but now supports little vegetation. This dyke was never one of the best, being far too brackish, but is of little entomological interest at all now. The very interesting and productive dyke right at the back of the marsh now contains very little water, and its appearance

was most disappointing. However, it still produced a substantial number of aquatic Coleoptera.

Three members of the party worked all day for water beetles and reported a good number of species, but the lepidopterists failed to report anything but a few of the commoner species.

Mr. Eagles comments on the plants as follows: on the collecting ground, the fields were bright with the flowers of *Ranunculus sardous* Crantz, a local plant of damp meadows. In the dykes were fine examples of another local buttercup, *R. sceleratus* L. Growing on the drier ground near the railway were two other local plants, *Trifolium squamosum* L. and *Chaenorhynchus minus* (L.) Lange. Some of the party were taken to see the scarce umbelliferous plant *Tordylium maximum* L. The fungus *Pleurotus cornucopiae* (Paulet) Pers. was growing in masses in fresh condition on dead elm branches.

Coleoptera reported were as follows, and unless stated otherwise were taken from the dyke at the back of the marsh: *Bembidion lunulatum* (Fourc.), a single example was found in the water net; *Haliphus laminatus* (Schall.), *H. apicalis* Thom., *H. lineatocollis* (Marsh), *H. ruficollis* (Deg.), *H. fluvialis* Aubé, *Noterus capricornis* (Herbst.), *Laccophilus minutus* (L.), *Hygrotus inaequalis* (F.), *Graptodytes lepidus* (Ol.), *G. lineatus* (F.), *Hydroporus palustris* (L.), *H. memnonius* (Nic.), *H. discretus* Fairm., *H. pubescens* (Gyll.), *H. planus* (F.), *Dytiscus scmisulcatus* Müll., *D. circumflexus* F., *Colymbetes fuscus* (L.), *Agabus conspersus* (Marsh.), *A. bipustulatus* (L.), *Gyrinus caspius* L., *Helochares lividus* (Forst.), *Laccobius biguttatus* Gerh., *Helophorus* (*Megalelophorus*) *aquaticus* (L.) (*aequalis* Thom.), *H. minutus* (Forst.), *H. (Atractelophorus) brevipalpis* Bedel, *Ochthebius impressicollis* Cast., *Coccidula scutellata* (Herbst), a few examples were taken on the vegetation in the dyke, *Cyphon variabilis* (Thunb.), on vegetation at the edges of the dyke, *Leptura livida* F., not uncommon on Yarrow towards the back of the marsh.

The Odonata reported included *Libellula depressa* L., *Sympetrum striolatum* (Charp.) the imagines of which were just emerging, and *Ischnura elegans* (v. d. Lind). Whilst the Hemiptera *Nepa cinerea* L. and *Ilyocoris cimicoides* (L.) were also noted.

PULBOROUGH, SUSSEX—9th July 1961.

Leader: Mr. D. A. ODD.

Thirty-four members were met at the rendezvous by the leader and although this meeting started with the sky a little overcast, it finished with bright sunshine. West Chiltington and Wiggon Halt Commons were worked and the following lepidopterous imagines were noted: *Pararge aegeria* L., *Maniola jurtina* L., *M. tithonus* L., *Coenonympha pamphilus* L., *Aphantopus hyperantus* L., *Polyommatus icarus* Rott., *Plebejus argus* L., *Lycaena phlaeas* L., *Vanessa atalanta* L., *V. io* L.,

Fabriciana (Argynnis) cydippe L., *Polygonia c-album* L., *Pieris rapae* L., *P. brassicae* L., *Ochlodes venata* Br. & Grey, *Zanclognatha nemoralis* F. (*grisealis* Schiff.), *Deilinia (Cubera) exanthemata* Scop., *Cybosia mesomella* L., *Anarta myrtilli* L., *Pachytenemia hippocastanaria* Hübn., *Plusia gamma* L., *Lygris testata* L., *Alcis repandata* L., *Pseudoterpna pruinata* Hufn., *Lycophotia varia* Vill. and *Hyphenodes (Tholomiges) turfosalis* Wocke. Among the micros were: *Agriphila (Crambus) culmellus* L., *Scoparia ambigualis* Treits., *Argyresthia nitidella* F., *Olethreutes (Argyroproce) lucunana* Schiff. and *Glyphipterix thrasonella* Scop.

Larvae of Lepidoptera were found as follows: *Callimorpha jacobaeae* L. on *Senecio jacobaea* L., and the fully fed larvae of *Nonagria typhae* Thunb. in the stems of *Typha latifolia* L.

In the marshy ground near the West Chiltington golf course there were large clumps of the moss *Polytrichum commune* Hedw. growing luxuriantly and "fruiting" freely. Here also was much *Sphagnum* moss among which were dozens of the fungus *Collybia palustris* (Peck) in excellent condition. Two local marsh plants were abundant, *Geum rivale* L. and *Viola palustris* L.

In the damp woodland on the way to the golf course the fern *Dryopteris spinulosa* (Mull.) Watt was prevalent.

The meeting ended at the leader's home where members were entertained to tea by Mrs. Odd, to whom our thanks are due. Thus ended a very pleasant day.

THURSLEY COMMON, SURREY—15th July 1961.

Leader: Mr. J. A. C. GREENWOOD.

The weather on the previous day had been very wet, and the morning seemed unpromising, which may have accounted for the party only reaching a maximum strength of six. In fact, the day turned out to be warm and fine until we were safely under cover and enjoying tea, when there was a torrential rainstorm.

The area worked was the large bog stretching for a considerable distance from the Elstead road. In spite of the previous day's rain, the going was relatively dry and firm. The bog is of particular interest to naturalists and would well repay further visits.

Some 24 species of macrolepidoptera were seen. These included: *Plebejus argus* L., *Heliothis maritima* Gras., *Eustrotia uncula* Clerck, *Sterrhia sylvestris* Hübn., *Thera firmata* Hübn., *Eilema griseola* Hübn. f. *stramineola* Doubl., *Cybosia mesomella* L. and larvae of *Saturnia pavonia* L., *Macrothylacia rubi* L., *Anarta myrtilli* L. and *Dasychira fascelina* L. (a dead specimen).

Microlepidoptera were numerous, but nothing of special interest was noted.

Dragonflies were especially plentiful, and added to our enjoyment of a pleasant day.

HOTHFIELD COMMON, KENT—23rd July 1961

Leader: Dr. E. SCOTT.

After a dull morning the sun broke through in the afternoon. Members arrived at 11 a.m., and were joined in the afternoon by a party from the Kent Field Club. Fresh specimens of *Argyresthia goedartella* L. were obtained early and a sprinkling of tortricids were disturbed from the foliage of birch, willow, aspen and other trees. Lunch was taken on a rise crowned by fine specimens of *Pinus sylvestris* L.

In the afternoon the central bog was explored. Most of the botanical specialties were readily found, including *Narthecium ossifragum* (L.) Huds., *Orchis* (*Dactylorchis*) *maculata* s.sp. *ericetorum* Vermeul, *Epilobium palustre* L., *Hypericum elodes* L., *Drosera rotundifolia* L., a few patches of *Anagallis tenella* (L.) Mum. and *Sphagnum* spp., some of which were in fruit. Earlier, in their restricted locality near the hospital, *Menyanthes trifoliata* L., *Carex rostrata* Stokes, *Orchis* (*Dactylorchis*) *praetermissa* Druce, *Viola palustris* L., *Myosotis secunda* Murr. and *Mentha* × *niliaca* Jacq. (*alopecuroides* Hull.) were seen; in most cases past their best. *Ulex minor* Roth. and *Genista anglica* L. were common in the heath. Butterflies were fairly common, including worn *Clossiana* (*Argynnis*) *selene* Schiff. and fresh *Lycaena phlaeas* L. Other Lepidoptera seen or taken were *Lasiocampa quercus* L. and *Schrankia costaeatrigalis* Steph. which was not uncommon in wet places among rushes. Capt. J. Ellerton took an example of the local tortricid *Epinotia* (*Eucosma*) *angustana* Hübn. not previously recorded from this district, though common in Blean Woods where the larva feeds on aspen. The character of parts of the Common is being altered by the growth of seedling trees of birch and aspen, and the bracken encroaches on some of the paths. In spite of this *Calluna vulgaris* L. (Hull) (Heather) flourishes in extensive areas and the central bog is as wet as ever, and almost unaltered. In the wetter part the fungus *Galera spahgnorum* Fr. was fairly abundant on the moss.

Lepidoptera observed and not mentioned above were: *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Aphantopus hyperantus* L., *Coenonympha pamphilus* L., *Thymelicus sylvestris* Poda, *Ochlodes venata* Br. & Grey, *Callimorpha jacobaeae* L., *Plusia gamma* L. (about six), *Apatele megacephala* Schiff., *Leucania pallens* L., *Apotomis* (*Argyroploce*) *capreana* Hübn., *Acleris emargana* Hübn. (*Peronea caudana* F.), *Olethreutes lacunana* Schiff., *Dichrorampha* (*Hemimene*) *petiverella* L., *Nymphula nymphaeata* L., *Lomaspilis marginata* L., *Geometra* (*Hipparchus*) *papilionaria* L., *Anagoga pulveraria* L., *Deilinia* (*Cabera*) *pusaria* L., *Acasis viretata* Hübn., *Argyresthia retinella* Zell. and *Lithocolletis ulmifoliella* Hübn.

GODALMING, SURREY—30th July 1961.

Leader: Mr. R. W. J. UFFEN.

A group of five members enjoyed this ramble along the bank of the Wey through its marshes between Godalming and Eashing, where lush

vegetation typical of fens having little surface water in summer occurs. The party moved along a vague path, trampled through the tall herbage by fishermen, dense patches of nettles sometimes exacting their toll.

Meadowsweet (*Filipendula ulmaria* (L.) Maxim.), was flowering by the acre amongst the reed-grasses (*Phalaris arundinacea* L. and *Glyceria maxima* (Hartm.) Holmb.), whilst large patches bore a mauve sheen of flowers and seed-pods of the Great Hairy Willowherb (*Epilobium hirsutum* L.). Fine clumps of Purple Loosestrife (*Lythrum salicaria* L.) and Marsh Ragwort (*Senecio aquaticus* Hill) glowed in the sun in the more open spots, with Orange Balsam (*Impatiens capensis* Meerburgh) lower down; and in the river itself, Yellow Water-lily (*Nuphar lutea* (L.) Sm.).

Plants which attracted attention amongst the general vegetation included *Myosoton aquaticum* (L.) Moench, *Symphytum officinale* L. (mostly with pale pink flowers), *Dipsacus pilosus* L. (a strong colony), two shaded plants of *Heracleum sphondylium* L. at least 8-ft. tall, *Scutellaria galericulata* L., and *Thalictrum flavum* L.

The sun was warm enough to dull the reactions of the collector, and seemed to keep most insects from flying above the level of the herbage. The *Angelica* flowerheads were noticeably devoid of visitors other than a few soldier beetles and an unexpected *Strangalia quadrifasciata* (L.), but the hum from the more shaded vegetation told of an abundance of diptera among the stems. The meadows across the river scintillated with white butterflies, and *Pieris rapae* L. and *P. brassicae* L. were common closer at hand. Single examples of *Gonepteryx rhamni* L., *Vanessa atalanta* L., *Nymphalis io* L. and *Polyommatus icarus* Rott. were seen, but a partly wooded path which is a favourite territory of butterflies was not being patrolled.

Gerris pond-skaters were in large patches all along the river-bank, whilst several dragonfly species soared overhead.

A few leaves of the abundant old alders were rolled by *Gracillaria* larvae, and the "snail-track" mines of *Phyllocnistis suffusella* Zell. were plentiful on poplars near the station. Other microlepidopterous larvae were: *Elachista cerusella* Hübn., *Mompha fulrescens* Haw. (mostly pupated), *Epermenia illigerella* Hübn., *Anthephila* (*Simaethis*) *fabriciana* L.

After refreshment with cold drinks at Eashing, the party returned to Godalming, tired by the hill climbing diversions, initiated by a member who was believed to know a short way back. At one stage this involved sliding down a 20-ft. road-cutting when the path at the top petered out, and one fence vaulted over, proved to be the bottom of a garden. Quite the most unusual meeting of the season.

ADDINGTON, SURREY—5th August 1961.

Leader: Mr. N. WILDING.

Due to prolonged and heavy rain in the morning the leader found himself alone at the meeting place. Collecting was impossible and he

returned home. In the afternoon, however, the weather cleared and two members turned up who collected for some two hours. They recorded the following lepidopterous larvae: *Eupithecia haworthiata* Doubl., in flower buds of *Clematis vitalba* L.; *Hysterosia* (*Phtheocroa*) *soduliana* Haw., in the berries of *Rhamnus cathartica* L.; *Lithocolletis scabiosella* Dougl., in leaves of *Scabiosa columbaria* L. The two micros are specialities in the district and *L. scabiosella* Dougl. is not found outside Surrey.

WROTHAM, KENT—12th August 1961.

Leader: Mr. E. J. HARE.

Only four members were present at this meeting. No doubt the holiday season was largely responsible for the poor attendance. The weather was certainly not to blame, for it was fine and reasonably warm throughout the day.

The party met at the Vigo Arms and proceeded to the downs overlooking the village of Trottiscliffe (locally pronounced 'Trosley') and the Pilgrim's Way, working first the wooded part at the top and then moving to the open part of the chalk downs below. Insects were scarce on the whole, an exception being *Aspitates gilvaria* Schiff., which was plentiful on the downs.

Other Lepidoptera noted were: *Scopula ornata* Scop.; *Ortholitha bipunctaria* Schiff.; *Nephopterix semirubella* Scop.; *Stenoptilia zophodactyla* Dup., larvae in seedheads of *Centaureum erythraea* Rafn.; *Oidematophorus carphodactylus* Hübn., larvae commonly in the flowers of *Inula conyzia* DC.; and *Mompha terminella* Westw., larvae scarce in the leaves of *Circaea lutetiana* L.

Only one beetle was reported, namely, *Smicronyx reichi* (Gyll.), the larvae of which were found in seedheads of *Centaureum erythraea* Rafn.

The party adjourned at 4.30 p.m. for tea and gossip at the Pilgrim's Rest on the A20 road.

GOMSHALL, SURREY—20th August 1961.

Leader: Mr. R. F. BRETHERTON.

Eight members met at Gomshall Station and walked by the lane and fields to Hackhurst Downs, near the top of which sandwiches were eaten. The weather was cloudy until after noon, and insects seemed to be generally scarce. Sixteen species of butterflies were seen. These included *Lysandra coridon* Poda, which was fairly numerous but past its best, and a very dark aberration of *Lycaena phlaeas* L., but nothing was seen of *Hesperia comma* L., for which these Downs are a well-known locality. Among the moths, only *Scopula ornata* Scop. and *Eupithecia sobrinata* Hübn. were noteworthy. Larvae of *Thera juniperata* L. were

obtained freely by beating, and two or three of *Eupithecia denotata* Hübn. from the seeds of scattered plants of *Campanula trachelium* L. A few heads of *Inula conyzia* DC., gathered as a speculation, yielded in the following fortnight half a dozen adults of that very local plume moth *Oidaematophorus (Leioptilus) carphodactylus* Hübn. Descending from the Downs, some members explored a promising lucerne field and also a marsh beside the main road which contained a fine growth of *Angelica sylvestris* L. Tea was taken at the Old Cottage, Shere.

BASTED, KENT—27th August 1961.

Leader: Miss CHRISTINE McDERMOTT.

Soon after entering the private road, two specimens of the fungus *Pluteus cervinus* (Schaeff.) Fr. were noticed growing on a log. Along the same road were several plants of *Symphytum peregrinum* Ledeb. (Blue Comfrey) still in bloom, and some handsome plants of *Pimpinella major* (L.) Huds. (Greater Burnet Saxifrage) including a fine example of the pink form.

Much time was spent in a marshy clearing away from the road. It was crossed by a stream along which was an attractive display of *Myosotis palustris* L. Two species of liverwort, *Conocephalum conicum* (L.) Dum. and *Lunaria cruciata* (L.) Dum., flourished here. Everywhere in the clearing were plants of *Cardamine flexuosa* With., no longer in bloom.

It was too early in the year for much fungus to be about, but examples of several species were seen. On a moss-covered willow log were some 30 specimens of the fungus *Scutellinia scutellata* (L.) Lamb. The bright red cups surrounded by black hairs were admired. Other fungi noticed were *Collybia radicata* (Rehl.) Berk., *Lactarius quietus* Fr., *Galera tenera* (Schaeff.) Fr., *Bolbitius fragilis* (L.) Fr., *Coryne sarcodes* (Jacq.) Tul., *Polyporus radiatus* (Sow.) Fr. and *Trametes rubescens* (A. & S.) Fr.

The moss *Dicranoweisia cirrata* (Hedw.) Lindb. had evidently been common on the trees when growing and was now plentiful on the fallen logs. One mycetozoan was noticed, probably *Craterium minutum* Fr.

In rough marshy ground near the clearing, *Hypericum tetrapterum* Fr. (Square-stemmed St. John's Wort) was plentiful and in flower.

The Kingfisher, Grey Wagtail and Great Spotted Woodpecker were seen.

By the waterside on the way back to the public road the introduced plant *Mimulus guttatus* DC. (Monkey-flower) was in bloom. Other plants seen were: *Acer platanoides* L. (Norway Maple), *Chrysosplenium oppositifolium* L. (Opposite-leaved Golden Saxifrage), leaves only, *Caltha palustris* L. (King Cup), leaves only, *Campanula trachelium* L. (Nettle-leaved Bellflower), *Erigeron acris* L. (Blue Fleabane).

Lepidoptera recorded were: *Lycaena phlaeas* L., *Pieris rapae* L., *P. napi* L., *Pararge megera* L., *Nymphalis io* L., *Aglais urticae* L., *Polyommatus icarus* Rott,

The long-horn bush cricket, *Pholidoptera griseoaptera* (Deg.) was reported and the Hairy Snail, *Trichia hispida* L. was also seen.

A number of spiders were recorded as follows: *Araneus diadematus* Clerck, *Meta segmentata* (Clerck), *Clubiona terrestris* West, *Linyphia triangularis* (Clerck), *Meioneta rurestris* (Koch, C. L.), *Lepthyphantes zimmermanni* Bert., and *Erigone dentipalpis* (Wider).

TRING, HERTS.—3rd September 1961.

Leader: Mr. B. GOATER.

Five members assembled at Tring in a heavy thunderstorm, and after whiling away nearly an hour with entomological reminiscences in a shop doorway, three of the party decided to yield to the weather and go home. The two survivors waited a little longer, and as the storm showed some signs of abating, passed on to the local reservoirs and Nature Reserves. The vegetation was sopping wet and very little insect life was observed. A considerable quantity of the rare rush, *Juncus compressus* Jacq., was found on the shore of one of the reservoirs. *Butomus umbellatus* L. and *Bidens cernua* L. were seen by the canal. The mosses *Tortula ruralis* (Hedw.), *Bryum* spp. and *Orthotrichum* spp. (some of them fruiting), occurred on the walls of the reservoir, and the heavily-shaded ground in the Nature Reserve woodland was covered with loose heaps of *Thamnium alopecurum* (Hedw.).

The reservoirs are noted for their birds, but on this day the only noteworthy species was a pair of Great Crested Grebes and a dozen or so Herons.

KNOLE PARK, SEVENOAKS, KENT—9th September 1961.

Leader: Dr. A. M. MASSEE.

Seven members attended this meeting on a beautiful, warm, sunny day. The following Coleoptera were noted: In deer dung—*Aphodius zenkeri* Germ., *A. ater* (Deg.), *A. rufipes* (L.), *A. sphaecelatus* (Panz.) and *A. quadrimaculatus* (L.) (Scarabaeidae). Under beech bark: *Cerylon histeroides* (F.), *C. ferrugineum* Steph. and *Bitoma crenata* (F.) (Colydiidae). In beech bark: *Trypodendron domesticum* (L.) and *Taphrorychus bicolor* (Herbst) (Scolytidae).

The Hemiptera-Heteroptera (Miridae) reported were: *Megacoelum infusum* (H.-S.) on oak, *Lygus contaminatus* (Fall.) on birch, *L. rugulipennis* (Popp.) in grass tufts, and *Monalocoris filicis* (L.) on bracken.

FIELD MEETING PERSONALITIES.

- (1) Mr. F. J. Coulson (left) and Mr. C. N. Hawkins, Wimbledon.
- (2) Mr. F. D. Buck (left) and Dr. B. P. Moore, Higham.
- (3) Dr. A. M. Masee, Knowle Park.
- (4) Mr. E. J. Hare, Wrotham.

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CHIPSTEAD, SURREY—16th September 1961.

Leader: Mr. T. R. EAGLES.

Mr. F. T. Vallins who should have led this meeting was in hospital for an operation, which was happily successful.

Despite perfect weather only three attended and they devoted their attention to Coleoptera and fungi. The most interesting beetle taken was *Panagaeus cruz-major* (L.). Others were *Aphodius rufipes* (L.), *Rhinosimus ruficollis* (L.), *Sermylassa halensis* (L.) and *Sphaeroderma rubidum* Graëlls. On an ash tree near the entrance to the wood was a very handsome example of the fungus *Polyporus hispidus* Fr. As usual here, *Polyporus giganteus* Fr. was abundant. Unhappily for fungus hunters, the Banstead Urban District Council had tidied the rides by sawing up or burning much of the fallen wood but the locality is still well worth visiting. Species of *Russula* were plentiful, including *R. lepida* Fr. and *R. lutea* Fr. Curled up under the cap of a specimen of *Coprinus plicatilis* (Curt.) Fr. was a larva of the moth *Rusina tenebrosa* Hübn.

The mosses *Atrichum undulatum* (Hedw.) P. Beauv. and *Pseudoscleropodium purum* (Hedw.) Fleisch. were noticeably abundant.

The party walked round the field where *Teucrium botrys* L. grows. There were small patches of the plant in most parts of the field. The vegetation was short as the field had been cut a year or so ago. Many downland plants were, or had been, in flower.

WIMBLEDON COMMON, SURREY—23rd September 1961.

Leader: Mr. R. W. J. UFFEN.

The day was warm, overcast and very humid, the sun only appearing very briefly in the afternoon. To all but one of the five members who gathered at the War Memorial at Wimbledon this was home ground.

Young black poplars (*Populus nigra* L.) planted along a horse ride yielded a solitary caterpillar of *Laothoe populi* L. and a variety of leaf-miners: *Phyllocnistis suffusella* Zell., *Nepticula* (*Stigmella*) *trimaculella* Haw., *Gracillaria stigmatella* F., and an unidentified agromyzid fly.

Coleophora argentula Zell. cases were plentiful on the seed-heads of Yarrow (*Achillea millefolium* L.) and other species were conspicuous on the heads of *Juncus*, but several species known to occur here in the autumn had not yet appeared.

The small copper (*Lycaena phlaeas* L.) was the only butterfly in flight, but the dung beetle *Aphodius prodromus* (Brahm) was very active over horse droppings.

Gorse pods contained numbers of adult *Apion ulicis* (Forst.) and larvae of *Laspeyresia succedana* Schiff.

Some time was spent searching areas where rubbish has been tipped to fill up damp hollows, in the hope of finding larvae of Coleophoridae on seeds of Chenopodiaceae, but most had already left the plants. One case resembling that of *Coleophora clypeiferella* Hof. was found on *Atriplex*. *Phthorimaea seminella* Pierce & Metcalfe larvae were found on *Chenopodium* in spinings amongst the seeds. Numerous, mostly alien, plants were seen in flower, the mild autumn doubtless prolonging the display. *Linaria pupurea* (L.) Mill., *Cymbalaria muralis* Baumg., *Malva neglecta* Wallr. were amongst these.

Other insects noted included the Lepidoptera *Platyptilia gonodactyla* Schiff., and *Plutella maculipennis* Curt., together with the larvae of *Swammerdamia heroldella* Hübn. and *Gracillaria syringella* F. The only Diptera noted were imagines of *Paroxyna misella* (Loew) and the larvae of *Acidia cognata* (Weid.).

HIGHAM SALTINGS, KENT—1st October 1961

Leader: Mr. E. E. J. TRUNDELL.

In spite of heavy and prolonged rain in the early morning, this meeting was very well supported, over 20 members and friends being present. A couple of heavy showers failed to spoil an otherwise fine day.

The saltings consist of large areas of rich vegetation just above the tide level, but occasionally washed by very high, wind-driven tides, and there are large accumulations of tidal refuse against the sea wall. Behind this are stretches of the now disused Thames-Medway canal, and low-lying pasturage which is divided and sub-divided by many dykes.

The meeting was favoured by a large contingent from the ranks of the coleopterists, who worked the salt marsh on the foreshore in front of the sea wall for most of the day and found Coleoptera scarce. Sweeping the vegetation produced *Amara convexiuscula* (Marsh.), *Coccinella undecimpunctata* L., *Lathridius bifasciatus* Reitt., *Anthicus quisquilius* Thoms. and an occasional example of *Dromius linearis* Ol.; whilst a search beneath tidal refuse turned up *Dicheirotichus pubescens* Payk., *Dromius linearis* Ol. again and *Metabletus obscuroguttatus* F. Whilst searching at the roots of plants generally in the drier situations *Dromius linearis* Ol. was once again found together with *D. melanocephalus* Dej. and *Microlestes maurus* Sturm. A concentrated and definite search for *Mecinus collaris* Germ., at the roots of *Plantago maritima* L. did in fact turn up that species, but only a few were found. In the same situation a single *Lathridius bifasciatus* Reitt. was taken, a remarkably damp spot for this insect which had probably fallen from the higher vegetation. *Chrysolina banksi* F. was found at the roots of *Ballota nigra* L. Other Coleoptera reported but not mentioned above were: *Noterus clavicornis* Deg., *Hygrotus inaequalis* F., *Berosus affinis* Brullé, *Orytelus inustus* Grav., *Tachyporus hypnorum* (F.), *Coccidula rufa*

(Herbst.), *Scymnus suturalis* Thunb., *Adalia decimpunctata* (L.), *Longitarsus rubiginosus* (Foud.) *Chaetocnema concinna* (Marsh.), *Phyllotreta undulata* Kuts., *Apion aeneum* (F.), *A. malvae* (F.), *A. semivittatum* Gyll., and *Sitona suturalis* Steph. ab. *ononidis* Sharp.

Several examples of the dragonfly *Aeshna mixta* Latr. were noted.

A few common butterflies were seen, and one or two *Larentia clavaria* Haw. were netted. Microlepidoptera reported were: the larvae of *Coleophora lineola* Haw. and *C. erigerella* Ford. The milk thistle *Silybum marianum* (L.) Gaertn. was reported by the botanists and also the fungi *Hypholoma hydrophilum* Bull., *Lepiota naucina* Fr., and *Marasmius androsaceus* L., also the moss *Bryum argenteum* Hedw. which was fruiting abundantly.

OXSHOTT, SURREY—8th October 1961.

Leader: Mr. T. R. EAGLES.

The weather was perfect. Twenty-two members and their friends attended.

The only Lepidoptera noted were larvae of *Macrothylacia rubi* L. sunning themselves on the heather.

Fungi were abundant. The bolets *Boletus bovinus* (L.) Fr., *B. variegatus* (Swartz) Fr., and *B. badius* Fr. were in great numbers. Clearly it was an exceptionally good year for this genus. The edible species *Amanitopsis fulva* (Grev.) Rea, was also plentiful. Interesting finds were two species of *Hydnum*, *H. auriscalpium* L. and *H. scrobiculatum* Fr. and two of *Gomphidius*, *G. rutilus* (Schaeff.) Fr. (= *viscidus* (L.) Fr.) and *G. roseus* Fr.

A group of red-capped *Russula* spp., sometimes with the stems flushed with pink, attracted much attention. They were identified as *R. sanguinea* (Bull.) Fr. List of fungi: *Amanita virosa* Fr., *A. citrina* (Schaeff.) Roques, *A. muscaria* (L.) Fr., *A. rubescens* (Pers.) Fr., *Amanitopsis fulva* (Grev.) Rea, *Tricholoma aggregatum* (Schaeff.) Secr., *T. rutilans* (Schaeff.) Fr., *Clitocybe aurantiaca* (Wulf.) Studer, *C. vibecina* Fr., *C. clavipes* (Pers.) Fr., *C. ditopus* Fr., *C. odora* (Bull.) Fr., *Laccaria laccata* (Scop.) Cke., *L. amethystina* (Vaill.) Cke., *Mycena galopus* (Pers.) Fr., *M. sanguinolenta* (A. & S.) Fr., *M. corticola* (Pers.) Fr., *Collybia maculata* (A. & S.) Fr., *Marasmius androsaceus* (L.) Fr., *Omphalia fibula* (Bull.) Fr., *Hygrophorus coccineus* (Schaeff.) Fr., *H. unguinosus* Fr., *Lactarius torminosus* Fr., *L. plumbeus* Fr. (= *turpis* Fr.), *L. blennius* Fr., *L. pyrogalus* (Bull.) Fr., *L. piperatus* (Scop.) Fr., *L. quietus* Fr., *L. rufus* (Scop.) Fr., *L. subdulcis* (Pers.) Fr., *L. mitissimus* Fr., *Russula nigricans* Fr., *R. cyanoxantha* (Schaeff.) Fr., *R. emetica* (Schaeff.) Fr., *R. fragilis* Fr., *R. sanguinea* (Bull.) Fr., *atropurpurea* Krombh., *R. ochroleuca* Fr., *R. exalbicans* Bres., *R. aeruginea* Lindb., *R. chloroflora* Grove, *Nolanea stauropora* Bres., *Hebeloma mesophaeum* (Pers.) Fr., *Flammula sapinea* Fr.,

Cortinarius hemitrichus (Pers.) Fr., *C. acutus* (Pers.) Fr., *C. semi-sanguineus* Gillet, *Inocybe fastigiata* (Schaeff.) Fr., *Paxillus involutus* (Batsch) Fr., *P. atrotomentosus* (Batsch) Fr., *Stropharia semi-globata* (Batsch) Fr., *Hypholoma fasciculare* (Huds.) Fr., *Coprinus micaceus* (Bull.) Fr., *Gomphidius rutilus* (Schaeff.) Fr. (= *viscidus* (L.) Fr.), *G. roseus* Fr., *Boletus borinus* (L.) Fr., *B. variegatus* (Swartz) Fr., *B. badius* Fr., *B. cramesinus* Secr., *B. scaber* (Bull.) Krombh., *Polyporus perennis* Fr., *P. amorphus* Fr., *P. betulinus* Fr., *Fomes annosus* Fr., *Polystictus versicolor* Fr., *P. abietinus* Cke., *Trametes rubescens* Fr., *Hydnum auriscalpium* L., *H. scrobiculatum* Fr., *Stereum purpureum* Pers., *Thelephora terrestris* Pers., *Sparassis crispa* Fr., *Calocera cornea* Fr., *C. viscosa* Fr., *Lycoperdon perlatum* Pers., *L. pyriforme* Schaeff., *Scleroderma aurantium* Pers.

COLLEY HILL, SURREY—14th October 1961.

Leader: Mr. F. M. STRUTHERS.

A party of four met at Reigate station and made their way to the lower slopes of Colley Hill. The weather was bright and sunny with little wind and a temperature in the lower sixties.

Working along the bottom of the hill, a few butterflies were noticed on the wing: *Aglais urticae* L., *Lycaena phlaeas* L. and a female *Polyommatus icarus* Rott. Larvae of *Eupithecia pimpinellata* Hübn. were collected from the seedheads of *Pimpinella saxifraga* L., and larvae of *Coleophora discordella* Zell. on *Lotus* and of *Parornix* (*Ornix*) *arellanella* Staint. on hazel were also taken.

During lunch some seedling Harebells were examined, and the weevil *Miarus campanulae* (L.) was found. After lunch, members explored a thicket of lichen-covered hawthorn bushes and managed to disturb a number of the very variable *Acleris* (*Peronea*) *cristana* F., in fine condition. Other moths disturbed by beating were *Oporinia christyi* Prout and *Acleris rhombana* Schiff. (*Peronea contaminana* Hübn.).

A PROVISIONAL LIST OF THE COLEOPTERA IN WOOD WALTON FEN, HUNTS.

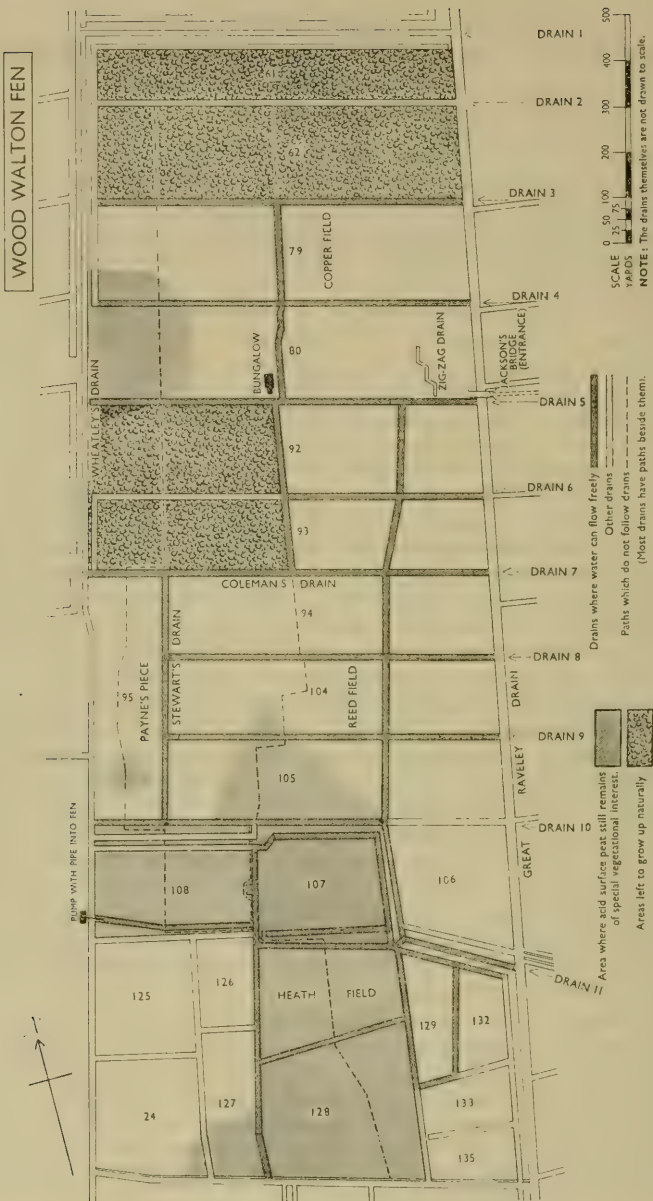
By F. D. BUCK

Wood Walton Fen is a National Nature Reserve in Huntingdonshire, near Ramsey, some ten miles from Huntingdon. It covers an area of approximately a mile and half long by half a mile wide. The Great Raveley Drain forms its eastern boundary and Wheatley's Drain its western. North and south it is confined by two subsidiary drains feeding the Great Raveley Drain. A provisional survey suggests the level of the fen falls some 12 to 18 inches in the south-north direction.

Fen-like conditions are only maintained by careful management because the Reserve is entirely surrounded by agricultural land which requires totally different conditions from the fen. To make these conditions more difficult the fen stands across the drainage of farmland to the south-west and the main drain for the area, the Great Raveley Drain. Prior to the very recent construction of the new drain from drain 10 to drain 5 across compartments 105, 104, 94, 93 and 92, this water ran straight through the fen from Wheatley's Drain to the Great Raveley via Coleman's Drain (drain 7). Thus the fen often moved from dry conditions to flooded conditions, and vice versa, in quite a short space of time. It is anticipated that the change in the drainage system of the fen will even out the magnitude of these changes, will conserve the water within the fen and will raise the water table.

The fen can be divided into two quite distinct types of habitat; the smaller, which occupies three areas, consists of acid surface peat and supports *Molinia* heath, scattered birch and fen woodland, mainly alder. This habitat type has the appearance of being transitional between fen proper and dried up fen such as Holm Fen. It would seem to be almost certain that if the water table dropped permanently to any appreciable extent, the drainage of the areas would rapidly silt up and very soon it would resemble Holm Fen. Since these areas retain some of the original surface peat they are of particular interest, especially from the botanical point of view, and as the vegetation is so different, from a zoological aspect also; though little of outstanding interest has been noted amongst the Coleoptera.

The remainder of the fen has at some time been subjected to peat cutting and now consists of a neutral fen peat. Two complete compartments of this type of habitat, 61 and 62, and the western halves of compartments 92 and 93, are being left to grow naturally. In other places considerable attention has been given, or is likely to be given, to bush clearing. This has provided a collecting area in the Copper field which is of particular interest. Drove are regularly mown throughout the fen and litter heaps are left.



These two types are clearly shown on the accompanying map, as are the areas which are to be left to grow naturally. Also shown is the drainage system, in which those drains which permit the free passage of water are indicated. Of the remaining drains many contain water when the fen is really wet and some, such as those separating compartments 124, 125, 126 and 127 at the south end of the fen, are now mere depressions in the ground containing no water at all. This area is now grazed by cattle. An interesting paper on the Nature Reserve has been written by Dr. E. Duffey (1957, *Ent. Gaz.*, 8: 143-150).

Work on the Coleoptera of the fen has been regularly undertaken in company with Mr. A. E. Gardner since 1957; before this, only one visit had been paid to the locality, in August 1956.

Perhaps the most outstanding, and not a little surprising, thing which has emerged from these four years steady work is the considerable changes which occur in the coleopterous fauna. One year a species will be present in some numbers and then quite unaccountably will disappear; such was the case with *Oodes helopioides* (F.), which was reasonably common in 1957 but which we have not seen since. Similarly, a species which is normally very abundant will in one season become relatively scarce. This happened to *Agonum thoreyi* Dej. this year, and on some visits in the spring it was not in evidence at all. This does, of course, happen in all localities, but is far more marked in Wood Walton Fen. It is most likely connected with the comparatively rapid changes from dry to flooded conditions and back again; and perhaps also to the work of the Nature Conservancy in attempting to get the area back to more fen-like conditions.

One naturally tends to compare Wood Walton Fen with Wicken Fen, but it is by no means easy to obtain a satisfactory comparison in respect of the coleopterous fauna. Wicken Fen has in the past been more fashionable amongst entomologists than Wood Walton, and in consequence much more work has been put in on the Cambridgeshire fen. Apart from the work of H. Fortescue Fryer and the unpublished lists provided by Dr. Duffey, little in the way of regular work at Wood Walton is available.

In terms of numbers, the present work includes 722 species as against 1,055 listed in *The Natural History of Wicken Fen*, Part IV, 1928, pp. 267-297, and Part VI, 1932, pp. 480-538; however, some 200 of the species here recorded from Wood Walton do not appear to occur at Wicken. Broadly speaking, Wicken would appear to be richer in those species which are not entirely fen-land insects. This may in some measure be due to the larger area and more stable conditions at Wicken, and also to the surrounding country, which though still agricultural does not seem to confine Wicken so tightly as it does Wood Walton; but the present writer is convinced that many more species will be found to exist at Wood Walton. There are some notable absentees, which being fenland species and occurring at Wicken might be expected to occur at Wood Walton also, but as yet have not been taken. Such species include *Colliurus melanura* L., *Oberea oculata* L., *Blethisa*

multipunctata L. and *Elaphrus riparius* L. The first-named would appear unlikely to occur since there are no reed beds standing in water in Wood Walton like those in which this species has been found so commonly in Norfolk. It is doubtful, too, if *O. oculata* L. will be found at Wood Walton, but in places conditions are suitable for both *B. multipunctata* L. and *E. riparius* L. What is more interesting is the complete absence of *Donacia* and *Plateumaris* compared with 12 species at Wicken. It is indeed rare to find a reasonable stretch of water with suitable vegetation, be it river, ditch or pond, which does not support a single species from one of these genera. Though it is difficult to imagine it completely exterminating a species, one can only assume it to be due to the regular cleaning of the drains.

The genus *Stenus*, too, is by comparison poorly represented, 22 species as against 49 at Wicken. Some of the absentees in this genus are quite remarkable; *S. juno* F. and *S. pubescens* Steph. are instances of widely distributed and quite common species which are apparently absent from Wood Walton. However, in common with Wood Walton, Wicken has a very poor heteromorous fauna—as, indeed, one would expect in fen-land localities.

There can be no comparison between Wood Walton and Holm Fen. The latter is dried up, primarily birchwood, with all but a very few drains now non-existent. In fact, most of the old drains can be traced only with difficulty. Two visits in 1960 produced such poor results that it was decided to discontinue working the locality. Other workers in other Orders appear to have formed the same opinion.

Wood Walton is, as far as the Coleoptera are concerned, quite distinct from the Norfolk fen and broadland localities known to the present writer, and apart from those species which can be expected in almost any damp, inland locality, there is little in common between them. Notable exceptions to this being *Trichocellus placidus* Gyll., *Agonum thoreyi* Dej., *Oodes helopioides* F., *Silis ruficollis* F., *Agapanthia villosoviridescens* Deg., and *Anthocomus rufus* Herbst.

During the course of the work, Dr. Duffey made available a list of Coleoptera which was based in 1939 by H. St. J. K. Donisthorpe on lists sent by him in 1916, and by G. W. Nicholson in 1910, to Charles Rothschild, together with additional records from the Victoria County History of Huntingdonshire. The Nicholson list was, it seems, destroyed by Donisthorpe. Dr. Duffey also supplied a list compiled in 1939 by J. C. F. Fryer. Both are bare lists without any comment whatever and quite obviously do not include all the beetles seen by these workers because they are relatively short lists and many extremely common species are not included. In the list which follows the Nicholson-Fryer-Donisthorpe lists are only referred to where the species has not been found during the past four years' work, or does not figure in the list of H. Fortescue Fryer. The records of H. Fortescue Fryer were published in 1913 and 1914 (*Ent. mon. Mag.*, **24**: 245-250 and 266-268, and **25**: 10-88 and 109-111), and these are only shown where unconfirmed in this recent work. Professor F. Balfour-Browne (1951, *Trans. Soc.*

Brit. ent., 10: 234-268) compiled a list of aquatic Coleoptera which includes the aquatic Palpicornia but not the terrestrial Palpicornia; and no mention is made of the Dryopidae or the aquatic *Rhynchophora*. Again these are only shown where they have not been confirmed.

In addition to these lists, Dr. Duffey has, from time to time as they have come to hand, supplied copies of lists sent him by coleopterists who have visited the fen; these are: Mr. Anthony Eve, Mr. R. A. Crowson, and the Rev. E. J. Pearce. In his communication to Dr. Duffey the last named commented on the lack of moss on the banks of the drains compared with his earlier collecting and the consequent loss of the pselaphid fauna therein. One must agree very few of the Pselaphidae recorded by Pearce have been found during this period. Dr. Duffey was good enough to obtain, through the kindness of Mr. Colin Matheson, details of the material from Wood Walton Fen in the Pearce collection in the National Museum of Wales at Cardiff, which proved to be sparser than was at first imagined.

The fauna of the fen must, to some extent, have changed since the lists of Nicholson, Donisthorpe and the two Fryers, and one suspects is still undergoing some fairly rapid changes. One is struck by the fact that, though it is obvious that Nicholson, Donisthorpe and Fryer, J. F. C., did not record all the beetles they saw, some species they have recorded have been surprisingly unconfirmed. *Agonum assimile* (Payk.), to instance just one example, usually abounds where it occurs, but has not been found at all during the recent work. The original peat area in the south end of the fen would appear to be an ideal situation for this species.*

There are several species associated with mud, such as the *Dyschirius* and *Clivina fossor* (L.), which have occurred mainly in vegetable litter. In general such mud as there is in the fen is not easy to reach, but at such times as the water in the drains is low and the mud exposed, it is surprising how little can be found on it. This may well be a matter of optimum conditions, and is of course a problem not confined to the fen. However it does not explain the occurrence of these species in litter heaps which is considerably different from the normal type of habitat for them.

The genus *Haliphus* presents difficulty, not only in respect of determination of species, but also with regard to collecting. The different species, in the fen at any rate, appear to live together, and although a species in a particular drain is indicated, *H. ruficollis* (Deg.) will almost certainly be found there also, generally in superior numbers. Thus, considering the impossibility of separating with certainty, all but a few members of this genus in the field, substantial samples would be necessary to get even a vague idea of the relative distribution of the genus within the fen.

*Since writing the above, a single example of *Agonum assimilis* (Payk.) has been taken under the bark of a fallen poplar in compartment 108. The species is extremely scarce in the Fen.

Amongst the Silphidae it is remarkable that of five species of *Necrophorus*, large conspicuous beetles, recorded by Nicholson, Donisthorpe and the Fryers, none have been found during the present investigation, although some very suitable pabulum has at times been available. Much the same applies to *Hister* and *Saprinus*.

In the present work the records from the Nicholson-Fryer-Donisthorpe lists are indicated (N.-F.-D.); from the H. Fortescue Fryer list (H. F. F.); and from the Balfour-Browne list (B.-B.). The months in which the species have been taken are shown by the use of roman lower case numerals at the end of the remarks on each species, but as the months are not shown in the above mentioned lists, these of course cannot be given.

During the course of the work in the fen, a considerable amount of help has been received; and thanks are due to Dr. E. Duffey and the Nature Conservancy for permission to work the fen, permission to reproduce the map and two of the photographs, and to Dr. Duffey in particular for the information and help he has constantly given; to Mr. Gordon Mason, the Warden, who has been most helpful and co-operative; to Mr. A. E. Gardner, a constant companion in field work, who has provided much interesting information, particularly on the aquatic species, and has been a willing driver to and from the fen. Thanks are also due to Mr. Colin Matheson and the Trustees of the National Museum of Wales for making the Pearce records available, to Mr. H. Last who has determined many of the troublesome aleocharines, and the following who have joined Mr. Gardner and me in the field and made their captures known: Dr. A. M. Masee, Dr. B. J. MacNulty, Dr. J. Newton and Mr. J. L. Henderson.

COLEOPTERA WITHIN THE FEN

CARABIDAE

Carabus nemoralis Müll. (N.-F.-D.); *C. granulatus* L., in vegetable litter and under the bark of fallen trees, on Central drove between drains 5 and 7, iv, v; *C. monilis* F. (N.-F.-D.); *Notiophilus substriatus* Waterh. (H.F.F.); *N. germyi* Fauv., (*hypocrita* Putz.), in vegetable litter on the Copper field, xi; *N. palustris* (Dufts.), in vegetable litter and running on path, Central drove, in 107 and on Copper field, iv, vi, viii, xi; *N. biguttatus* (F.), in vegetable litter on Copper field, (Gardner), viii; *Leistus fulvibarbis* Dej. (N.-F.-D.); *L. ferrugineus* (L.), drove 6 (Gardner), vi; *L. rufescens* (F.) (*terminatus* (Hellw.)), at times extremely abundant, in vegetable litter, Central drove and drove 5, v, x; *Nebria brevicollis* (F.), in vegetable litter on Central drove, vii; *Elaphrus cupreus* Dufts., in the corner of drain 5 on mud (Gardner), v; *Loricera pilicornis* (F.) (N.-F.-D.); *Clivina fossor* (L.), in vegetable litter on Copper field, iii, *Dyschirius aeneus* (Dej.) (N.-F.-D.), and although there are many species in the N.-F.-D. list which we have not taken, it is more than likely that this is the following species, which was not known to occur in this country when those workers were visiting



A general view of the Fen looking south from Drove 5 along Central drain showing "fen" and "carr" vegetation in mid-summer.



Junction of drain 10 and Stewart's drain showing the north boundary of Compartment 108 in early summer.

the fen; *D. luedersi* Wagn., in vegetable litter and on small patches of mud, on Central drove between drains 5 and 8, v, vi; *D. globosus* (Herbst), in vegetable litter and on small patches of mud, on Central drove and on Copper field, iii, iv, vi, viii, xi; *Panagaeus crux-major* (L.), a single example in vegetable litter on Central drove by drain 5 and two examples have been taken by Mr. Gardner on drove 5 and on Central drove between drains 5 and 7, v; *Badister bipustulatus* (F.), in vegetable litter, on Central drove and on Copper field, ii, iv, vi, x; *B. sodalis* (Dufts.), mainly in vegetable litter, but occasionally under the bark of fallen trees, Central drove, drove 5 and Copper field, iv, v, ix; *Oodes helopioides* (F.), in vegetable litter, drove 5 and Central drove between drains 7 and 5, v; *Stenolophus skrimshiranus* Steph., in vegetable litter on Copper Field (Gardner), iv; *S. mixtus* (Herbst), in vegetable litter along Central drove between drains 5 and 7, and in Copper field, vi, xi; *Acupalpus dorsalis* (F.), in vegetable litter (Gardner), v; *A. exiguus* Dej., in vegetable litter on Copper field, iii, Fryer (1913, *Ent. mon. Mag.*, 24: 248) also records it; *A. dubius* Schilsky (*luridus* auct. nec Dej.), in vegetable litter throughout the fen, xi; *Bradycellus harpalinus* (Serv.), in vegetable litter throughout the fen, v, viii, ix, x; *B. sharpi* Joy, in vegetable litter on Copper field, ix; *Trichocellus placidus* (Gyll.), very common in vegetable litter throughout the fen, iii, iv, v, vi, viii, ix, x, xi; *Harpalus affinis* (Schrank) (*aeneus* (F.)) (N.-F.-D.); *H. tardus* (Panz.), in vegetable litter on Copper field (Gardner), viii; *Stomis pumicatus* (Panz.), in vegetable litter throughout the fen, v, viii, xi; *Pterostichus caeruleus* (L.) (N.-F.-D.); *P. niger* (Schal.), under bark on drove 5 and under birch bark in west side of 105, iv; *P. melanarius* (Ill.), (*vulgaris* Schaum., nec L.) (N.-F.-D.); *P. anthracinus* (Ill.), (H.F.F.); *P. nigrita* (F.) (N.-F.-D.); *P. gracilis* (Dej.), in vegetable litter on Central drove and in the eastern section of 94, also a single example on a patch of mud on Central drove at dyke 8, iv, vi; *P. minor* Gyll., in vegetable litter and under bark, throughout the fen, iv, v, viii, ix, xi; *P. strenuus* (Panz.), in vegetable litter on Central drove and on Copper field, v, vi, viii, ix, xi; *P. diligens* Sturm., in vegetable litter and under bark, Central drove, drove 5, east part of 94, and on Copper field, iv, v, viii, ix, xi; *Amara apricaria* (Payk.), in vegetable litter on Central drove, ix; *A. praetermissa* (Sahl.) (*rufocincta* Dej.) (H.F.F.); *A. aulica* (Panz.), in vegetable litter, and one example on a thistle, Central drove and 104, vii; *A. similata* (Gyll.), in vegetable litter on Copper field, xi; *A. anthobia* Villa, in vegetable litter on Copper field (Gardner, det. Dr. B. P. Moore, 1957, *Ent. Gaz.*, 8: 125), ix, again on Copper field, viii; *A. familiaris* (Dufts.), in vegetable litter, Central drove and Copper field, iii, v, viii, xi; *A. lucida* (Dufts.), in vegetable litter along drove 10, iv; *A. aenea* (Deg.), in vegetable litter on Central drove, and on Copper field, v, viii; *A. communis* (Panz.), in vegetable litter, Central drove, drove 5, in 94 and on Copper field, v, viii, xi; *A. plebeja* (Gyll.), in vegetable litter, Central drove and on Copper field, iii, v, viii, xi; *A. eurynota* (Panz.) in vegetable litter on Central drove (Gardner det. Dr. B. P. Moore), ix;

Calathus ambiguus (Payk.) (N.-F.-D.); *Agonum assimile* (Payk.) (N.-F.-D.); *A. ruficornis* Goeze, in vegetable litter throughout the fen; vii; *A. obscurum* (Herbst), in vegetable litter and under bark, throughout the fen, iv, v, vi, viii, ix, xi; *A. livens* (Gyll.), a single example in vegetable litter in 104, and a further example (Gardner) in 92, iv, ix; *A. muelleri* (Herbst), in vegetable litter in 92, ix, x; *A. marginatum* (L.), a single example in vegetable litter on Central drove, x; *A. nigrum* Dej. (*dahli* de Borre), a single example on Central drove, in vegetable litter, vi; *A. viduum* (Panz.) (N.-F.-D.); *A. moestum* (Dufts.), recorded by Fryer, H. F., as an aberration of *A. viduum* (Panz.) (1913, *Ent. mon. Mag.*, 24: 249), in vegetable litter on Central drove (Gardner), ix; *A. versutum* (Gyll.), in vegetable litter on drove 10, iv; *A. fuliginosum* (Panz.), in vegetable litter and under bark throughout the fen, iv, v, viii, ix, x, xi; *A. gracile* (Gyll.), in vegetable litter, Central drove, drove 5, Copper field and Payne's Piece, iii, iv, v, x, xi; *A. thoreyi* Dej., very common in vegetable litter throughout the fen, sometimes in vast numbers though at times it is unaccountably absent, iv, v, vi, viii, xi; *Odontonyx (Olisthopus) rotundatus* (Payk.), (N.-F.-D.); *Bembidion guttula* (F.), in sedge litter on Central drove, xi; *B. biguttatum* (F.), in vegetable litter on Copper field, x; *B. articulatum* (Panz.), on mud in old peat area, (Gardner), x; *B. unicolor* Chaud. (*mannerheimi* Sahlb. nec Dej.), in vegetable litter, Central drove, drove 10, and on Copper field, iii, iv, viii, x, xi; *B. iricolor* Bedel, in vegetable litter on Copper field (Gardner), viii; *B. fumigatum* (Dufts.), (N.-F.-D.); *B. assimile* Gyll., in vegetable litter on a small patch of mud on Central drove and on drove 5, vi, viii, xi; *B. clarki* Daws., in vegetable litter along drove 10, iv; *B. gilvipes* Sturm., in vegetable litter on Central drove and on Copper field, iii, iv, xi; *B. properans* Steph., in vegetable litter on Copper field (Gardner), ix; *B. tetracolum* Say. (Gardner, det. Dr. B. P. Moore) ix; *B. andreae* (F.) s.sp. *bualei* Duval, in vegetable litter on Copper field (Gardner), viii; *B. genei* Kust., s.sp. *illigeri* Netol., on mud on dried up part of Central drain, 108, vii; *B. quadrimaculatum* (L.), in vegetable litter on Copper field and in east part of 94, iv; *Trechus rivularis* (Gyll.), in vegetable litter on Central Drove between drains 3 and 5, ix; *Lebia chlorocephala* (Hoff.), a single example taken by R. D. Weal in vegetable litter on Central Drove between drains 5 and 7, v; *Demetrius atricapillus* (L.), in vegetable litter on Copper field, Central drove and drove 10, iv; *D. monostigma* Sam., on Copper field, Central drove and drove 5, viii, ix, x, xi; *Dromius linearis* (O1), extremely common in vegetable litter throughout the fen, and occasionally swept, iii, iv, v, vi, vii, viii, ix, x, xi; *D. quadrimaculatus* (L.), beaten from dead twigs along new path across 92 and 93, and a single example swept on Copper field, vi, ix; *D. melanocephalus* Dej., very common in vegetable litter and sometimes by sweeping, throughout the fen, iii, iv, v, viii, ix, x, xi; *Metabletus foveatus* (Fourc.), in vegetable litter on Central drove between drains 5 and 2, v; *M. truncatellus* (L.), in vegetable litter on Central drove between drains 3 and 5, and in 109, ix, x.

HALIPLIDAE

Haliphus confinis Steph. (B.-B.); *H. mucronatus* Steph., recorded by Balfour-Browne on a single example in April 1894; *H. flavicollis* Sturm. (B.-B.); *H. fulvus* (F.) (B.-B.); *H. variegatus* Sturm. (B.-B.); *H. ruficollis* (Deg.), this is the commonest member of the genus by far and occurs throughout the fen, iv, v, vi, vii, x; *H. heydeni* Wehncke, an addition to the Balfour-Browne list and has been taken by both Gardner and Henderson in Central drain and Stewart's drain, viii; *H. wehnckeii* Gerh., a single example in drain 5, vi; *H. immaculatus* Gerh., in Central drain and drain 5, and Gardner swept it in August, iii, vi, viii, ix; *H. lineolatus* Man. (*nomax* B.-B.) (B.-B.); *H. lineatocollis* (Marsh.), in central drain (Henderson and Gardner), v, vi, x; *Peltodytes caesus* (Dufts.) (B.-B.).

HYGROBIIDAE

Hygrobia hermanni (F.) (*tardus* (Herbst)) (B.-B.).

DYTISCIDAE

Noterus capricornis Herbst (*sparsus* Marsh.) (B.-B.); *N. clavicornis* (Deg.), in drain 5 (Gardner), iv, v, vi; *Laccophilus hyalinus* (Deg.), in Central drain, iv, vi; *L. minutus* (L.), in Central drain and drain 5, v, vi, x; *L. variegatus* (Germ.) (N.-F.-D.); *Hyphydrus ovatus* (L.), throughout the fen, iv, v, vi, vii, ix, x, xi; *Hygrotus versicolor* (Schall.) (B.-B.); *H. inaequalis* (F.), very common throughout the fen, v, vi, vii, x; *H. decoratus* (Gyll.), *H.* (s.gen. *Coelambus*) *confluens* (F.), *H.* (s.gen. *Coelambus*) *impressopunctatus* (Schall.) and *Deronectes assimilis* (Payk.) (B.-B.); *D. elegans* (Panz.), a single example in drain 7, vii; *D. duodecimpustulatus* (F.) (B.-B.); *Oreodytes* (*Deronectes*) *halensis* (F.), in central drain and drain 5, iv, v, vi, x; *Hydroporus pictus* (F.), in Central drain, drains 5 and 6, v, vi, viii, ix, x; *H.* (*Graptodytes*) *granularis* (L.) (B.-B.); *H.* (*G.*) *lepidus* (Ol.), two examples in drain 6, v; *H.* (*G.*) *lineatus* (F.), a single example in drain 6, vi; *H. dorsalis* (F.), in Central drain and in drains 5 and 7, also in Stewart's drain, iv, vi, vii; *H. gyllenhalii* Schiödte (B.-B.); *H. striola* (Gyll.), in drain 6, iv; *H. palustris* (L.), throughout the fen, iv, v, vi, vii, viii, x; *H. incognitus* Sharp (B.-B.); *H. erythrocephalus* (L.), in central drain, Stewart's drain and drain 5, iv, v, vi, x, xi; *H. melanarius* Sturm., in Central drain, and drains 5, 6, 7 and 10, v, vi, vii; *H. memnonius* Nic., in Central drain, and drains 5 and 6, vi; *H. obscurus* Sturm. (B.-B.); *H. discretus* Fairm., a single example in drain 6, not recorded by Balfour-Browne, vi; *H. pubescens* (Gyll.), in Central drain and Stewart's drain, iv, vi, ix, x; *H. planus* (F.), in Central drain and Coleman's drain, x; *H. tessellatus* Drap., in Central drain and drain 5 (Gardner), v, vi; *Agabus uliginosus* (L.), a single example in Central drain, viii, Balfour-Browne (1950, *Brit. Water Beetles*, 2: 88) records a dull female taken by Donisthorpe, vi; *A. unguicularis* Thomson (B.-B.); *A. didymus* (Ol.) (N.-F.-D.); *A. nebulosus* (Forst.) (B.-B.); *A. undulatus* (Schränk), throughout the fen,

iv, v, vi, vii, viii, ix, x, xi; *A. sturmi* (Gyll.), throughout the fen, iv, v, vi, vii, ix, x, xi; *A. chalconatus* (Panz.) (B.-B.); also ab. *melanocornis* Zimm., a single example in Stewart's drain, vii; *A. bipustulatus* (L.), though perhaps our commonest British *Agabus* is much less common in the fen than *A. undulatus* (Schrank), in Central drain, Stewart's drain and drain 5, iv, v, ix, x; *Platambus maculatus* (L.) (B.-B.); *Ilybius fuliginosus* (F.), in Stewart's drain and drain 5, v, vi, vii; *I. fenestratus* (F.), in Central drain, Stewart's drain and drains 5, 6, 7 and 10, v, vi, vii; *I. ater* (Deg.), in Central drain, Stewart's drain and drains 5 and 6, v, vi, vii, viii, xi; *I. quadriguttatus* (Lac.) (*obscurus* (Marsh)), throughout the fen, v, vi, vii, viii, ix, xi; *Copelatus haemorrhoidalis* (F.) (*ruficollis* (Schall.)), in drain 5, iv, v; *Rantus grapii* (Gyll.), in Central drain, Coleman's drain, Stewart's drain, and drains 5 and 6, iv, v, vi, vii, viii, x; *R. exsoletus* (Forst.), in Central drain and drains 5 and 6, iv, v, vi; also ab. *nigriventris* Newb. & Sharp (B.-B.); *R. pulverosus* (Steph.), in drain 5 (Gardner), v; *R. frontalis* (Marsh.) (*notatus* (F.)) (B.-B.); *Colymbetes fuscus* (L.), in Central drain Stewart's drain and drain 5, v, vii, ix, x; *Dytiscus semisulcatus* Müll., in Central drain and drain 5, iv, v, x; *D. marginalis* L., in Central drain, Zig-zag drain, Stewart's drain and drains 5, 7 and 10, iv, v, vi, vii, viii, ix, x; *D. circumflexus* F., Central drain and drain 6, not recorded by Balfour-Browne, iv; *D. circumcinctus* Ahr., in Central drain, and drains 5, 6, 7 and 10, iv, v, vi; *D. dimidiatus* Bergstr., in Central drain, Stewart's drain and drain 5, iv, v, vi, vii; *Hydaticus transversalis* (Pont.), in Central drain and drain 5, iv, v, vi; *H. seminiger* (Deg.) in drains 5 and 6, iv, v, vi; *Aeilus sulcatus* (L.) in Central drain; Coleman's drain and drain 5, not recorded by Balfour-Browne, iv, v, vi, ix, x.

GYRINIDAE

Gyrinus natator (L.) and the aberration *substriatus* Steph., in almost all drains throughout the fen, iv, v, vi, viii, x; *G. caspius* Mén. (*elongatus* Ab.), *G. marinus* Gyll. and *G. aeratus* Steph. (*thompsoni* Zait., *edwardsi* Sharp) (B.-B.).

HYDROPHILIDAE

Hydrochara (*Hydrophilus*) *caraboides* (L.) (B.-B.); *Hydrobius fuscipes* (L.), in Central drain and drains 5 and 6, iv, v, vi, vii; the aberration *picicrus* Thoms. is recorded in Balfour-Browne's list; *H. (Timnoxenus) niger* (Zsch.), in Central drain and drains 5 and 6, iv, v, vi, x; *Enochrus melanocephalus* Ol. (*atricapillus* Steph.), a single example in Central drain, vi; *E. testaceus* (F.), in Central drain and drain 5, v, vi; *E. (Philydrus) ochropterus* (Marsh.) (*frontalis* (Er.)), in Stewart's drain and drain 5, v, vii; *E. (P.) affinis* (Thunb.) (*minutus* auct Brit.), *E. (P.) coarctatus* (Gredl.) and *Cymbiodyta marginella* (F.) (B.-B.); *Anacaena globulus* (Payk.), in Central drain, Coleman's drain, Stewart's drain, and in vegetable litter on droves 3, 5 and 7, iv, v, vii, viii, ix, xi; *A. limbata* (F.) (*ovata* Reiche), in Central drain, Stewart's drain, drains 5, 6 and 7, and in vegetable litter on

Central drove and drives 5 and 6, v, vi, vii, viii, x; *A. bipustulata* (Marsh.) (B.-B.); *Helochaetes lividus* (Forst.) (*griseus* (F.)) in Central drain, Stewart's drain and drains 5 and 6, vi, vii, ix; *Laccobius sinuatus* Mots., in Coleman's drain (Henderson), x; *L. alutaceus* Thoms., *L. minutus* (L.), and *L. biguttatus* Gerh. (B.-B.); *L. striatulus* (F.) (*nigriceps* Thoms.) drain 5, ix; *Berosus luridus* (L.), in drain 5 (Gardner), v, vi; *B. affinis* Brullé, in Central drain, iv, v; *Limnebius truncatellus* (Thunb.), in Coleman's drain (Henderson), x; *L. papposus* Muls., *L. nitidus* (Marsh.), *L. aluta* Bedel, and *Chaetarthria seminulum* (Herbst), (B.-B.); *Helophorus* (s.gen. *Megalelophorus*) *aquaticus* (L.), in Coleman's drain (Henderson), x, Balfour-Browne also records the aberration *aequalis* Thoms.; *H. nanus* Sturm (B.-B.); *H. minutus* F. (*affinis* (Marsh.)), very commonly in Central drain and drains 5, 6 and 7, also in vegetable litter, v, vi, vii, xi, *H. flavipes* F. (B.-B.); *H.* (s. gen. *Atractelophorus*) *brevipalpis* Bedel, in drain 6 (Gardner), viii; *Hydrochus brevis* (Herbst), *H. elongatus* (Schall.) and *H. carinatus* (Germ.) (B.-B.); *Ochthebius minimus* (F.) (*impressus* (Marsh.)), in Coleman's drain (Henderson), x; *Hydraena testacea* Curt. (Gardner), viii; *H. riparia* Kug., in Central drain (Henderson), x; *H. rufipes* Curt., in drain 5, ix; *Cercyon atomarius* (F.) (*haemorrhoidalis* (Herbst nec F.)), in vegetable litter on Central drove, v, vi, viii, ix; *C. minutus* Muls., Copper field (Gardner), viii; *C. analis* (Payk.) (*flavipes* (Thunb.)), in vegetable litter on Central drove and on Copper field, iii, vi, ix; *C. terminatus* (Marsh.), in vegetable litter on Central drove, viii; *C. pygmaeus* (Ill.), in vegetable litter on Central drove, v, ix; *C. tristis* (Ill.), in vegetable litter on Central drove, v, viii; *Megasternum obscurum* (Marsh.) (*boletophagum* auctt.), in vegetable litter throughout the fen, v, viii, x, xi; *Sphaeridium scarabaeoides* (L.), in vegetable litter on Copper field (Gardner), iv, ix, *S. bipustulatum* F. in vegetable litter on Copper field (Gardner), vii.

STAPHYLINIDAE

Aleochara lanuginosa Grav. (N.-F.-D.); *A. divisa* (Sahlb.), in vegetable litter on Central drove (det. H. R. Last), v; *Crataraea suturalis* (Man.) (N.-F.-D.); *Oxytropa opaca* (Grav.), in vegetable litter on Central drove (det. Last), iv, vi, x; *O. longiuscula* Er. (*elongatula* Ab.), in vegetable litter on Central drove (det. Last), iv; *Drusilla* (*Astilbus*) *canaliculatus* (F.), in vegetable litter on Copper field, x, xi; *Atheta* (s.gen. *Philygra*) *debilis* (Er.) (N.-F.-D.); *A.* (s.gen. *Dinaraea*) *aequata* (Er.) (N.-F.-D.); *A.* (s.gen. *Dinaraea*) *linearis* (Grav.), in vegetable litter on Central drove, iv; *A.* (s.gen. *Tetropla*) *pallidicornis* (Thoms.), a single example in vegetable litter on Central drove (det. Last), v; *A.* (s.gen. *Tetropla*) *crassicornis* (F.), in vegetable litter on Central drove (det. Last), vi, ix; *A.* (s.gen. *Tetropla*) *trinitata* (Kraatz), in vegetable litter on Central drove (det. Last), v; *A.* (s.gen. *Lioglypta*) *longiuscula* (Grav.), in vegetable litter on Central drove v; *A.* (s.gen. *Acrotona*) *aterrima* (Grav.), a single example in vegetable litter on Central drove (det. Last), v; *A.* (s.gen.

Acrotona *fungi* (Grav.), in vegetable litter on Central drove and on Copper field (det. Last), iii; *A.* (s.gen. *Acrotona*) *laticollis* (Steph.), in vegetable litter on Central drove (det. Last), viii, ix; *A.* (s.gen. *Bessobia*) *occulta* (Er.), a single example in vegetable litter on Central drove (det. Last), iv; *Meotica exilis* (Er.), in vegetable litter on Copper field in some numbers, iii; *Amischa carifrons* Sharp, in vegetable litter on Copper field, iii; *Sipalia circellaris* (Grav.), in vegetable litter on Copper field, iii; *Gnypeta carbonaria* (Man.) (N.-F.-D.); *Falagria caesa* Er. (*sulcata* (Payk.)), a single example in vegetable litter on Central drove, v; *Cordalia (Falagria) obscura* (Grav.), in vegetable litter in Central drove, viii; *Autalia impressa* (Ol.), in vegetable litter (Gardner), ix; *Gyrophæna minima* Er. (N.-F.-D.); *Bolitochara lucida* (Grav.), a single example in vegetable litter on Central drove, v; *Hygronoma dimidiata* (Grav.), Crowson (in litt. Dr. Duffey), has obtained this species from debris thrown out of drain when clearing; *Myllaena dubia* (Grav.) (N.-F.-D.); *Cypha (Hypocyptus) longicornis* (Payk.), a single example in vegetable litter on Copper field, viii; *Conosomus littoreus* (L.), in vegetable litter on Copper field, iii, iv, xi; *C. testaceus* (F.), quite common in vegetable litter throughout the fen, iii, iv, v, viii, x; *C. pedicularius* (Grav.), extremely abundant in vegetable litter throughout the fen, iii, iv, v, vi, vii, viii, ix, xi; *C. lividus* Er., in vegetable litter on Copper field, xi; *Tachyporus obtusus* (L.), in vegetable litter and occasionally by sweeping, on Central drove, droves 3, 5 and 10, in Copper field and in 94, iii, iv, vi, viii, ix, xi; *T. solutus* Er., in vegetable litter on Central drove, v, ix; *T. pallidus* Sahlb., in vegetable litter on Central drove and swept in 94, iv, vi; *T. chrysomelinus* (L.), in vegetable litter and sometimes by sweeping, throughout the fen, iii, iv, v, viii, ix, x, xi; *T. hypnorum* (F.), quite common in vegetable litter and sometimes by sweeping, throughout the fen, iii, iv, v, vi, vii, ix, xi; *T. nitidulus* (F.), in vegetable litter throughout the fen, iii, iv, v, viii; *Tachinus humeralis* (Grav.), several examples in vegetable litter on Central drove, x; *T. signatus* Grav. (*rufipes* (Deg.)), in vegetable litter throughout the fen, v, viii, xi; *T. subterraneus* (L.), in vegetable litter on Central drove, ix; *T. marginellus* (F.), in vegetable litter on Central drove, v, vi, viii, xi; *T. flavolimbatus* Pand. (C. E. Tottenham), ix; *Bolitobius (Bryocharis) analis* (Payk.), in vegetable litter on Central drove and on Copper field, iii, viii; *Lordithon (Bolitobius) thoracicus* (F.), a single example in vegetable litter on Central drove vi; *Mycetoporus punctus* (Gyll.), in vegetable litter on Central drove (Gardner det. Last), viii; *M. splendidus* (Grav.), in vegetable litter on Central drove and on Copper field, iii, x; *Habrocerus capillaricornis* (Grav.), in vegetable litter, sometimes in plenty on Central drove, v; *Heterothops dissimilis* (Grav.), a single example on two separate occasions in vegetable litter on Copper field, iv, xi; *Quedius maurus* (Sahlb.), a single example in vegetable litter on Central drove, and also under bark of fallen poplar, west of drove across 105, iv, v; *Q. othiniensis* (Johansen) (H.F.F.); *Q. cruentus* (Ol.), in vegetable litter on Central drove (Gardner det. Last), ix; *Q. fumatus* (Steph.), a single example in

vegetable litter on east side of 94, iv; *Q. cinctus* (Payk.), a single example in vegetable litter on Central drove, xi; *Q. fuliginosus* (Grav.), in vegetable litter on east side of 94, iv; *Q. subfuliginosus* Britten, very common in vegetable litter on Central drove, Copper field and east part of 94, iii, iv, v, viii, xi; *Q. laevicollis* (Brullé) (*tristis* (Grav.)), a single example in vegetable litter (Gardner), on Copper field, viii; *Q. molochinus* (Grav.), in vegetable litter on Central drove and on Copper field, v, vi, viii, xi; *Creophilus maxillosus* (L.) (N.-F.-D.); *Ontholestes tessellatus* (Fourc.) (N.-F.-D.); *Staphylinus brunnipes* (F.), in vegetable litter on Central drove and on Copper field, iv, viii, ix; *S. fuscatus* (Grav.), a single example in vegetable litter on Copper field, viii; *S. winkleri* (Bern.), in vegetable litter on Central drove and on Copper field, viii; *S. globulifer* Fourc., in vegetable litter on Copper field (Gardner, det. Last), ix; *Philonthus addendus* Sharp, in remains of dead swan on Central drove, v; *P. tenuicornis* Muls. & Rey (*carbonarius* (Gyll.)), in vegetable litter on Central drove, vi, viii; *P. decorus* (Grav.), quite common in vegetable litter on Central drove and on Copper field, ix, xi; *P. cognatus* Steph., in vegetable litter on Central drove and on Copper field, v, viii, *P. varius* (Gyll.), in vegetable litter on Central drove and on Copper field, v, ix, xi, *P. fimetarius* (Grav.), in vegetable litter on Central drove, ix; *P. pachycephalus* Nordmann (*sordidus* (Grav.)), in vegetable litter, and on one occasion on a small patch of mud, on Central drove, vi, ix; *P. subuliformis* (Grav.) (*fuscus* Grav.), in a bird's nest in a hole in a fallen birch, 108, x; *F. ochropus* (Grav.) (*concinus* (Grav.)), in vegetable litter on Copper field, iii, xi; *P. debilis* (Grav.), in vegetable litter on Copper field, xi; *P. varians* (Payk.), in vegetable litter on Central drove, and on Copper field, iii, iv, xi; *P. quisquiliarius* (Gyll.), in vegetable litter on new path across 93, viii; *P. fumarius* (Grav.) (H.F.F.); *P. immundus* (Gyll.), in vegetable litter on Copper field, xi; *Gabrieus osseticus* (Kolen.), in vegetable litter on Central drove and on Copper field, v, viii; *G. trossulus* (Nor.), in vegetable litter on Copper field, iii, iv, xi; *Erichsonius* (*Actobius*) *cinerascens* (Grav.) (N.-F.-D.); *Xantholinus fracticornis* (Müll) (*punctulatus* (Payk.)), in vegetable litter on Central drove, vii, x; *X. angustatus* (Steph.), in vegetable litter on Central drove, v, ix; *X. linearis* (Ol.), in vegetable litter on Central drove, v, ix, *X. longiventris* Heer, in vegetable litter on Copper field, xi; *Atrechus affinis* (Payk.), under birch bark, 105, ix; *Gyrophypnus laeviusculus* (Steph.), a single example in vegetable litter on Central drove, iv; *Lathrobium elongatum* (L.), in vegetable litter on Central drove and on Copper field, iv, viii; *L. fovulum* Steph. (*punctatum* Fowler nec Zett.), in vegetable litter on Central drove and on Copper field, v; *L. fulvipenne* (Grav.), in vegetable litter on Central drove and on Copper field, iii, v, ix; *L. punctatum* (Fourc.) (*brunnipes* (F.)), very common in vegetable litter on Central drove and on Copper field, iv, v, vi, viii, ix; *L. geminum* Kraatz, in vegetable litter on Central drove, v; *L. impressum* Heer, in vegetable litter on Central drove and on Copper field, iii, iv; *Ochtheophilum* (*Cryptobium*) *fracticorne* Payk., not as common as expected, in vegetable

litter on Central drove and on Copper field, iii, iv, x, xi; *Rugilus (Stilicus) rufipes* (Germ.), in vegetable litter throughout the fen, iii, v, ix, xi; *R. similis* (Er.), in vegetable litter on Central drove, iv, v; *R. erichsoni* (Fauv.), in vegetable litter on Central drove, v, ix; *R. orbiculatus* (Payk.), in vegetable litter throughout the fen, ix, xi; *Astenus pulchellus* (Heer), in vegetable litter on Central drove and on Copper field, iii, iv, v, ix, xi; *A. longelytratus* Palm. (*angustatus* Gangl. nec. Payk.), in vegetable litter on Copper field, viii; *Paederus riparius* (L.), extremely common in vegetable litter and less commonly by sweeping, throughout the fen, iii, iv, v, vi, vii, x, xi; *Stenus bimaculatus* Gyll., in vegetable litter, throughout the fen, iii, iv, v, vi, viii, ix, xi; *S. ater* Mannerh., in vegetable litter on Copper field, viii; *S. clavicornis* (Scop.), in vegetable litter, throughout the fen, iii, x, xi; *S. rogeri* Kraatz, in vegetable litter on Central drove, iv; *S. incrassatus* Er., in vegetable litter on Central drove, vii; *S. boops* Ljungh (*bupthalmus* Grav.), and *S. nitens* Steph. (N.-F.-D.); *S. nanus* Steph., in vegetable litter, 94, iv; *S. carbonarius* Gyll. and *S. argus* Grav. (N.-F.-D.); *S. brunnipes* Steph., in vegetable litter on Central drove, ix; *S. palustris* Er., in vegetable litter on Central drove and in 94, iv; *S. impressus* Germ. (H. F. F.); *S. aceris* Steph., in vegetable litter on Central drove, ix; *S. pallipes* Grav. (N.-F.-D.); *S. flavipes* Steph., in vegetable litter on Central drove and on Copper field, iii, iv; *S. bifoveolatus* Gyll., in vegetable litter on Copper field, xi; *S. nitidiusculus* Steph., in vegetable litter on Central drove and on Copper field, iii, iv, v, viii; *S. picipes* Steph., in vegetable litter on Central drove and by sweeping in 80, 92, 93, and 94, vi, vii; *S. cicindeloides* (Schall.), in vegetable litter on Central drove and by sweeping in 80, 92, 93 and 94, iv, vii; *S. solutus* Er. (N.-F.-D.); *S. fornicatus* Steph., in vegetable litter on Central drove, xi; *S. latifrons* Er., in vegetable litter on Central drove, x; *Platystethus arenarius* (Fourc.), in vegetable litter on Central drove, vi; *P. nodifrons* (Sahlb.), (N.-F.-D.); *Oxytelus rugosus* (F.), in vegetable litter throughout the fen, iii, iv, v, vi, vii, viii, ix, x, xi; *O. sculptus* Grav., in vegetable litter on Central drove, vi; *O. tetracarınatus* (Block) was found in one pile only of vegetable litter on drove 7, between the Gt. Raveley drain and Central drain, which was more decayed than the others, and also in a dead swan on Copper field, vi; *Aploderus caelatus* (Grav.), in vegetable litter on the new path across 93 and on drove 5, v, viii; *Trogophloeus elongatulus* Er., a single example in vegetable litter on Copper field, iii; *Lesteva longoelytrata* (Goeze) (N.-F.-D.); *L. heeri* Fauv., in vegetable litter on Central drove and on Copper field, v, xi; *Olophrum piceum* (Gyll.), in vegetable litter on Copper field, iv, x; *O. fuscum* (Grav.), a single example in vegetable litter on drove 5, v; *O. nicholsoni* Don., two examples in vegetable litter on Copper field (Gardner, det. Last), x; *Anthobium atrocephalum* (Gyll.), in vegetable litter and sometimes by sweeping, Copper field and 94, iv, x, xi; *Omalium rivulare* (Payk.), in vegetable litter commonly throughout the fen, v, ix, x, xi; *O. caesum* Grav., in vegetable litter throughout the fen, and

in the remains of a dead swan on Central drove, v, ix, x; *Phyllodrepa floralis* (Payk.), beaten from hawthorn blossom, 105 and 107, v; *Xylodromus depressus* (Grav.) (N.-F.-D.); *Eusphalerum* (*Anthobium*) *minutum* (F.), beating hawthorn blossom and a single example was taken in vegetable litter, Central drove and 105 and 107, v; *E. luteum* (Marsh.), sweeping in 80, vi; *E. torquatum* (Marsh.), in *Ranunculus* blossom, by beating hawthorn blossom and by general sweeping, throughout the fen, v, vi; *Proteinus ovalis* Steph., in vegetable litter and carcasses throughout the fen, iv, v, vi, x; *P. brachypterus* (F.), in vegetable litter and carcasses, on Central drove and Copper field, iii, v, vi, xi; *P. macropterus* (Gyll.), in vegetable litter on Copper field (Gardner).

SILPHIDAE

Agathidium atrum (Payk.), in vegetable litter on Copper field, xi; *A. lavigatum* Er., in vegetable litter on Central drove, and on Copper field, sometimes in numbers, iii, v; *A. nigrinum* Sturm., in vegetable litter, on Copper field and on Central drove, sometimes in numbers, iii, xi; *Necrophorus humator* (Goeze), and *N. investigator* Zett. (N.-F.-D.); *N. vespilloides* Herbst (H.F.F.), also the aberrations *maculatus* Ellis and *disjunctus* Ellis; *N. vestigator* Hers., and *N. interruptus* Steph. (N.-F.-D.); *N. vespillo* (L.) (H.F.F.); *Silpha tristis* Ill., in vegetable litter on Central drove and on Copper field, v, viii, xi; *Thanatophilus rugosus* (L.), in remains of dead swan on Central drove, v; *Phosphuga atrata* (L.) and the aberration *pedemontana* (F.) (*brunnea* (Herbst)), in vegetable litter, and a single example under a stone, on Central drove and on Copper field, iii, iv, v, vi, vii, ix, x, xi; *Choleva agilis* (Ill.), a single example in vegetable litter on Central drove and another on Copper field, xi; *C. angustata* (F.), near bungalow (Gardner), iv; *Nargus velox* (Spence), in vegetable litter, often in numbers, on Central drove, v, ix, x; *N. wilkinii* (Spence), a single example in vegetable litter on Central drove, x; *Catops fuscus* (Panz.), a single example in vegetable litter on Central drove, v; *C. morio* (F.), in vegetable litter on Copper field, iii, xi; *C. kirbyi* (Spence), a single example in vegetable litter on Central drove, v; *C. nigricans* (Spence), near bungalow (Gardner), iv; *Sciodrepa fumata* (Spence) in vegetable litter on Copper field, xi; *Ptomaphagus subvillosus* (Goeze), in vegetable litter on Copper field, iii; *Colton dentipes*? Sahlb., in vegetable litter on Central drove, ix.

SCYDMAENIDAE

Stenichnus collaris (Müll.), in moss (Pierce), iii; *Euconnus hirticollis* (Ill.), in vegetable litter on Central drove and on Copper field, and Pierce has had it in moss, iii, iv, vi, viii.

PSELAPHIDAE

Pselaphus dresdensis Herbst (N.-F.-D.); *Tychus niger* (Payk.), a single example in moss with grass and some leaves in the vicinity of

the bungalow, also in moss (Pierce), iv, ix; *Bryaxis puncticollis* Denny (*validus* Aubé), taken by Pierce but there are no further data, viii; *B. (Bythinus) schneideri* Kug. (*bulbifera* (Reich.)), very common in vegetable litter throughout the fen, Pierce has had it in moss and in moss mixed with leaves and grass, iii, iv, v, vi, ix, xi; *Bythinus macropalpus* (Aubé), in moss mixed with grass and leaves in an area N. and W. of the bungalow (Pierce), iv, ix; *Rybaxis longicornis* (Leach) in a letter to Dr. Duffey R. A. Crowson records this species in debris thrown out of drain, and Pierce records a single example in moss by side of a ditch on the S. edge of the main entrance drove (drove 5), the ditch being almost dry, x*; *R. laminatus* Mots., in vegetable litter on Central drove, v, x; *Brachygluta fossulata* (Reich.), in moss (Pierce), vii, viii; *Biblopectus spinosus* Raffray, a male in wet moss (Pierce), viii; *B. pusillus* Denny, in bottom of a nearly dry ditch near entrance (Pierce) viii.

PTILIDAE

Acrotrichis atomaria (Deg.), a sample of the numerous *Ptilidae* was taken from various parts of the fen and all with few exceptions appeared to belong to this species, v; *Ptenidium nitidum* (Heer), in vegetable litter on Copper field, iii.

PHALACRIDAE

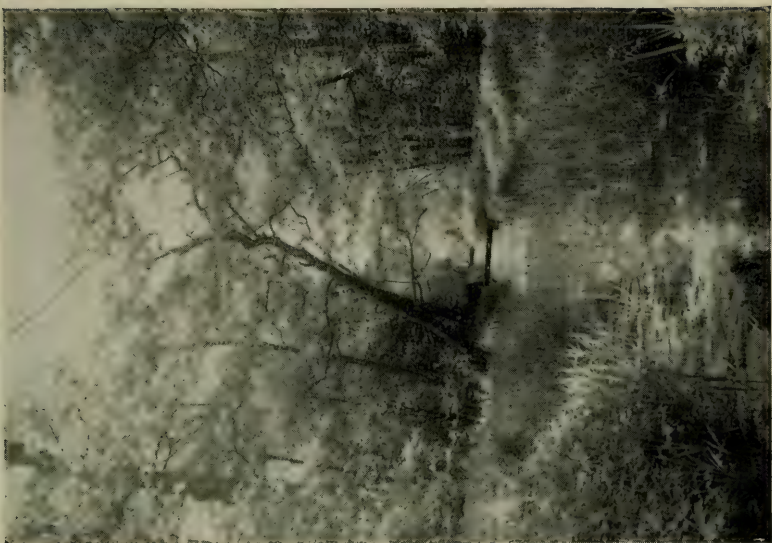
Phalacrus coruscus (Panz.), in vegetable litter on Copper field (Gardner), viii; *P. nigrinus* (Marsh.) (*caricis* Sturm.) and *Olibrus corticalis* (Panz.) (N.-F.-D.); *O. aeneus* (F.), in vegetable litter on Copper field, viii; *O. liquidus* Er., taken by Gardner, viii; *Stilbus testaceus* (Panz.), swept on Central drove and on Copper field, vii, viii, x.

COCCINELLIDAE

Subcoccinella vigintiquattuorpunctata (L.) (H.F.F.); *Adonia variegata* (Goeze) (H.-F.-D.); *Adalia bipunctata* (L.), general beating and sweeping throughout the fen, v, vi, ix; *A. decempunctata* (L.) general beating and sweeping throughout the fen, v, vii, ix; *Harmonia quadripunctata* (Pont.), a single example beaten from an oak on Central drove near bungalow (Dr. J. L. Newton), viii; *Coccinella undecimpunctata* L., taken by Gardner, vii; *C. septempunctata* L., general beating and sweeping throughout the fen, v, vi, vii, viii, x; *Propylea quatuordecimpunctata* (L.) (*Synharmonia conglobata* auctt.), general beating and sweeping throughout the fen, iv, v, vi, viii; *Calvia quatuordecimguttata* (L.), beaten from sallow on drove 5, and by general beating on new path

*The Pierce record of *Rybaxis longicornis* (Leach) is before the recognition of *R. laminatus* Mots., in this country, and it is possible that Crowson overlooked this addition to our fauna. Since all the examples which previously would have been referable to this species that have been found by the present writer have, in the case of the males, the only sex which can be identified with certainty, proved to be *R. laminatus* Mots.; *R. longicornis* (Leach), requires confirmation before it can be certain that the species does occur in the fen.

Drain 10, early summer, facing west.



Mown Central drove, looking north in early spring, showing the Copper field on the right of Central drain, with birch and sallow "carr" beyond.

across 93, vi, viii; *Thea vigintiduopunctata* (L.), general beating and sweeping throughout the fen, iii, iv, v, vi, vii, viii; *Micraspis sexdecimpunctata* (L.) (N.-F.-D.); *Scymnus punctillum* Weise, in vegetable litter on Copper field, viii; *S. redtenbacheri* Muls., in vegetable litter on Copper field, viii; *S. haemorrhoidalis* Herbst, in vegetable litter on Copper field (Gardner), ix; *Chilocorus renipustulatus* (Scriba), beating sal-lows along drove 5, v; *Exochomus quadripustulatus* (L.), a single example off oak on Central drove, vi; *Rhyzobius litura* F., in vegetable litter on Copper field, viii; *Corcidula rufa* (Herbst), in vegetable litter and by sweeping on Copper field and on Central drove, v, viii, x.

ENDOMYCHIDAE

Mycetaea hirta (Marsh.), a single example in vegetable litter on Central drove, x.

EROTYLIDAE

Cyrtotriplax bipustulata (F.), in vegetable litter in some numbers on one occasion only, on Central drove between drains 3 and 5, ix.

COLYDIIDAE

Myrmecixenus vaporariorum Guer., is recorded in the Nicholson-Fryer-Donisthorpe list; this is the species which seems to be regarded as occurring in heaps of potatoes, probably in clamps. There are, of course, no such stores in the fen, but there are on occasions potato clamps beside the lane leading to the fen entrance. It is possible that this species was taken in this way and thus is not strictly a Wood Walton Fen insect.

CERYLONIDAE

Cerylon histeroides (F.), under bark of birch and poplar, 105, iv; *C. fugi* Bris., under poplar bark, 104, iv.

HISTERIDAE

Hister neglectus Germ. and *H. carbonarius* Hoff. (N.-F.-D.); *Saprinus semistriatus* (Scriba) (H.F.F.); *S. aeneus* (F.) (N.-F.-D.); *Onthophilus striatus* (Forst.), in vegetable litter on Central drove, iv, viii, ix.

NITIDULIDAE

Brachypterus glaber (Steph.), sweeping nettles wherever they occur, vi; *B. urticae* (F.), sweeping nettles wherever they occur, vi, vii, viii; *Kateretes pedicularius* (L.) N.-F.-D.; *K. rufilabris* Lat., general sweeping, 92, 93, 94 and 104, vi, vii, viii; *Epuraea unicolor* (Ol.) (*obsoleta* (F.)), general sweeping and in vegetable litter on Copper field, and at sap of fallen alder on Central drove, also in 93 and 127, v, viii, ix, x; *E. pusilla* (Ill.), in vegetable litter on Central drove, ix; *Meligethes fulvipes* Bris. (N.-F.-D.); *M. aeneus* (F.), very commonly by sweeping, throughout the fen, vii, viii; *Librodor hortensis* (Fourec.), in vegetable

litter and, less commonly, by sweeping, on Central drove, on Copper field, and in 93 and 94, v, vi, vii, viii.

RHIZOPHAGIDAE

Rhizophagus bipustulatus (F.), under poplar bark (Gardner), vii.

LATHRIDIIDAE

Lathridius lardarius (Deg.), in vegetable litter on Central drove and on Copper field, viii, ix; *L. angusticollis* Gyll., a single example in vegetable litter on Central drove, viii; *L. nodifer* Westw., in vegetable litter on Central drove and on Copper field, iv, v, viii, x; *Enicmus minutus* (L.), in vegetable litter on Copper field, viii; *E. transversus* (Ol.), in vegetable litter on Central drove; vi; *E. histrio* Joy, sweeping in 94 and in vegetable litter on Central drove, vii, x; *Corticaria pubescens* (Gyll.), in vegetable litter and sometimes by sweeping almost anywhere in the fen, iv, v, x; *C. crenulata* (Gyll.), in vegetable litter on Copper field, viii; *C. impressa* (Ol.), in vegetable litter on Central drove, Copper field and drove 5, iv, v, viii, ix, xi; *Corticarina gibbosa* (Herbst), in vegetable litter and sometimes by sweeping almost anywhere in the fen, iv, viii, ix; *C. fuscata* (Gyll.), in vegetable litter on Central drove; x; *Melanophthalma transversalis* (Gyll.), abundant in vegetable litter throughout the fen, vii.

CUCUJIDAE

Laemophloeus ferrugineus (Steph.), under willow bark, 94, vii; *Psammoeccus bipunctatus* (F.), in vegetable litter on Central drove and on Copper field, viii; *Sileanus unidentatus* (Ol.), under willow bark, 94, vii.

BYTURIDAE

Byturus ochraceus (Scriba) (*fumatus* auctt.), very common on *Ranunculus* blossom, 92, 93, 94, 104 and 105, v; *B. tomentosus* (Deg.), on hawthorn blossom, 105 and 107, v.

CRYPTOPHAGIDAE

Telmatophilus caricis (Ol.) (N.-F.-D.); *Cryptophagus setulosus* Sturm., a single example in vegetable litter on Copper field, iii; *C. populi* Payk. (Gardner), viii; *C. scanicus* L. (Gardner), x; *C. dentatus* (Herbst), on *Polyporus betulinus* Fr. by bungalow, ix; *C. pilosus* Gyll. (Gardner), viii; *Antherophagus nigricornis* (F.), on Umbelliferae on drove 4, vi; *Atomaria linearis* Steph. (N.-F.-D.); *A. fuscata* (Schoen.), in *Polyporus betulinus* Fr. by bungalow, ix; *A. atra* (Herbst), in vegetable litter on Copper field, iii, v, viii; *A. atricapilla* Steph., in vegetable litter on Central drove, viii; *A. gutta* Steph., in vegetable litter on Copper field, iv; *A. mesomela* (Herbst) (*mesomelaena* auctt.), very common in vegetable litter on Central drove and on Copper field, iv, v, viii; *A. apicalis* Er., a single example in vegetable litter on Copper field, iii; *A. ruficornis* (Marsh.), in vegetable litter on Central drove, v;

Ephistemus globulus (Payk.), sometimes very common in vegetable litter, and on one occasion a few examples were found in *Polyporus betulinus* Fr., on Central drove, Copper field and by bungalow, iii, iv, v, viii, ix, x.

MYCETOPHAGIDAE

Litargus connexus (Geof.), under willow bark, 93, viii; *Mycetophagus multipunctatus* F., in *Polyporus betulinus* Fr., 105 and 108, viii, x; *M. quadripustulatus* (L.), in *Polyporus betulinus* Fr., 105 and 108, x; *M. atomarius* (F.), in *Polyporus betulinus* Fr., by bungalow, ix.

DERMESTIDAE

Dermestes murinus L., in remains of dead swan on Central drove, v; *Anthrenus scrophulariae* (L.), on bungalow window (Gardner), iv.

BYRRHIDAE

Cytilus sericeus (Forst.) (N.-F.-D.).

DRYOPIDAE

Dryops luridus Er., in dyke 5, v. vi; *D. ernesti* Des Gozis (*auriculatus* (Fowler)), (N.-F.-D.).

LUCANIDAE

Sinodendron cylindricum (L.), the remains of a specimen in birch, 108, xi.

SCARABAEIDAE

Aphodius scybalarius (F.), and *A. lividus* (Ol.) (N.-F.-D.); *A. fimetarius* (L.), under pile of grass cuttings on edge of Copper field (Gardner), ix.

ELATERIDAE

Melanotus rufipes (Herbst), imagines and larvae under birch bark and in rotten birch wood, 105, iv; *Athous haemorrhoidalis* (F.), beating and sweeping, 79, 80, 92, 93, 94, 104, and 105, vi; *Limonius aeruginosus* (Ol.) (N.-F.-D.); *Adrastus nitidulus* (Marsh.), general sweeping, 79, 80, 92, 93, 94, 104, vi, vii; *Agriotes obscurus* (L.), in vegetable litter on Central drove and on Copper field, and by sweeping in 94, 104 and 105, iv, v, viii; *A. pallidulus* (Ill.), general sweeping (Gardner), viii; *A. lineatus* (L.) (N.-F.-D.); *Dalopius marginatus* (L.), on hawthorn, and by general beating and sweeping, also in vegetable litter, throughout the fen, iv, v, vi, viii; *Ctenicera (Corymbites) incanus* (Gyll.), general sweeping of grasses, Central drove and on Copper field, v, vi; *Denticollis linearis* (L.), sweeping on Central drove, vi.

HELODIDAE

Microcara testacea (L.) (H.F.F.); *M. bohemani* (Mann.) and *Cyphon coarctatus* Payk. (N.-F.-D.); *C. paykulli* Guér., by sweeping and by beating throughout the fen, vi, viii; *C. variabilis* (Thunb.), sweeping on Central drove, vi; *C. ochraceus* Steph. and *C. padi* (L.) (N.-F.-D.).

CANTHARIDAE

Silis ruficollis (F.), general sweeping throughout the fen, vi; *Cantharis livida* L., sweeping in 93 and 94, vi; *C. pellucida* F., general sweeping on Central drove, v; *C. nigricans* (Müll.), beating and sweeping on Central drove and drove 9, and in 94, vi; *C. rufa* L., sweeping in 94, vi; *C. figurata* Mann. (N.-F.-D.); *C. pallida* Goeze, beating and sweeping on Central drove, on Copper field, in 80, and along the Gt. Raveley drain, vi, viii; *C. fulvicollis* F., sweeping in 93, vi; *C. thoracica* (Ol.), (*bicolor* Herbst), general sweeping along the Gt. Raveley drain, and in 92 and 93, vi; *Metacantharis clypeata* (Ill.) (*haemorrhoidalis* (F.)), general beating and sweeping throughout the fen, v, vi; *Rhagonycha fulva* (Scop.), very common on all vegetation throughout the fen, vii, viii; *R. testacea* (L.), sweeping on Central drove, along the Gt. Raveley drain, and in 80, 93, 94, and 104, vi; *R. limbata* Thoms., sweeping in 93, vi; *R. lignosa* (Müll.) and *Malthodes marginatus* (Lat.) (N.-F.-D.); *M. fuscus* (Waltl), a single example beaten from oak on Central drove (80), vi;

MALACHIIDAE

Azinotarsus ruficollis (Ol.), sweeping in 93, vi; *Anthocomus rufus* (Herbst), sweeping, it occurs mostly on Umbelliferae, 80, 93, 94, and on Copper field, vii, viii, ix; *A. fasciatus* (L.), sweeping reed in 104 (Gardner), viii.

DASYTIDAE

Dasytes plumbeus (Müll.), two examples swept in 94, vi; *D. puncticollis* Reitt., a single example swept in 94, vi.

CLERIDAE

Thanasimus formicarius (L.) (N.-F.-D.).

ANOBIIDAE

Anobium fulvicorne Sturm. (N.-F.-D.); *Stegobium paniceum* (L.), a single example swept in 94, this is usually found in stored food products, but it does from time to time turn up in such unlikely places as this, viii; *Ptilinus pectinicornis* (L.), beating in 93, vi.

CIIDAE

Cis bilamellatus Fowler, in *Polyporus betulinus* Fr., chiefly at the south end of the fen, does occur elsewhere, iv, viii; *C. bidentatus* (Ol.), in *Polyporus betulinus* Fr., in 108, x; *Enearthron affine* (Gyll.), in fungus on fallen trunk in 105, iv; *Rhopalodontus fronticornis* (Panz.) in fungus (Gardner). iv.

CERAMBYCIDAE

Aromia moschata (L.) (N.-F.-D.), Gordon Mason says it used to occur in large numbers but he has not seen it for several years, however, Dr. Duffey saw an example in 1961; *Clytus arietis* (L.), a single example on hawthorn blossom, 105; v; *Rhagium mordax* (Deg.), under birch bark, 108, x, xi; *Strangalia maculata* (Poda), sweeping on Central drove, drove

4, and in 94, vi, vii; *Agapanthia villosoviridescens* (Deg.), on Marsh Thistle, on Central drove, drove 7, along the Gt. Raveley drain, and in 94 and 104, v, vi, vii; *Saperda carcharias* (L.) (N.-F.-D.); *S. populnea* (L.), 2 examples beaten from sallow (H. D. Swain), vi.

CHRYSEMELIDAE

Lema cyanella (L.) (*puncticollis* Curt.), and *L. lichenis* Voet, (H.-F.-D.); *L. melanopa* (L.), sweeping in 92 and 93, and in vegetable litter on Copper field, on Central drove and droves 5 and 8, iii, iv, vi, viii; *Cryptocephalus moraei* (L.), swept from Marsh Thistle at south end of Central drove (Gardner), vii; *C. pusillus* F., sweeping on drove 5, ix; *C. labiatus* (L.), sweeping in Copper field and in 93, vi, viii, ix; *Chrysolina polita* (L.), sweeping and in vegetable litter, on Copper field, Central drove and drove 5, iii, v, vi, x, xi; *C. varians* (Schall.), a single example in vegetable litter, 108, iv; *C. graminis* (L.), sweeping Water Mint, on Copper field, 93 and 94, vi, viii, ix; *C. menthastri* (Suff.), swept, 94, vii; *C. fastuosa* (Scop.), *C. brunsvicensis* (Grav.) and *C. hyperici* (Forst.) (N.-F.-D.); *C. staphylea* (L.), swept in 92 (Gardner), ix; *Phytodecta decemnotata* (Marsh.) (*rufipes* (Deg.)) and *Gastrophysa viridula* (Deg.), (N.-F.-D.); *Phaedon cochleariae* (F.), sweeping on Central drove, ix; *P. tumidulus* (Germ.), in vegetable litter on Copper field (Gardner), ix; *Hydrothassa marginella* (L.) and *Prasocuris phellandrii* (L.) (N.-F.-D.); *Phyllobrotica quadrimaculata* (L.), swept in 94, vi; *Luperus longicornis* (F.) (N.-F.-D.); *Lochmaea crataegi* (Forst.), beaten from hawthorn not yet in bloom on Central drove, v; *Galerucella viburni* (Payk.), beaten on drove 5 and swept on new path across 93, viii, ix; *G. grisea* (Joan.), swept on new path across 93, v, viii; *G. lineola* (F.), on Copper field (Gardner), v; *G. californiensis* (L.), on sallow on drove 5 and on Central drove, v, viii, ix; *G. tenella* (L.), general sweeping throughout the fen, v, vii, viii, ix; *G. pusilla* (Dufts.), by sweeping and in vegetable litter, very common throughout the fen, iv, v, vi, vii, viii, ix; *Sermylassa* (*Sermyla*) *halensis* (L.), general sweeping, on Central drove, in Copper field and in 94, viii; *Longitarsus obliteratus* (Rosen.), sweeping and in vegetable litter on Central drove, ix; *L. brunneus* (Dufts.) (*castaneus* Foud. nec Dufts.), in vegetable litter on Copper field, ix, xi; *L. luridus* (Scop.), sweeping and in vegetable litter, 94, 95, 104 and 105, and on Copper field, iii, viii, ix, x; *L. rubiginosus* (Foud.), on *Convolvulus* sp., 93, Copper field and drove 5, viii, ix, x; *L. suturellus* (Duft.) (H. F. F.); *L. exoletus* (L.), a single example swept on Copper field, viii; *L. membranaceus* (Foud.), sweeping drove 5, ix; *L. curtus* (All.), a single example swept on drove 5, ix; *L. succineus* (Foud.), sweeping on Central drove, ix; *Haltica lythri* Aubé, quite common by general sweeping on Central drove, drove 7, along the Gt. Raveley drain and in 93, vi; *H. pusilla* Dufts., sweeping mainly irises, 94, iv; *Phyllotreta vittula* Redt., sweeping on Copper field and in 95, viii, ix; *P. undulata* Kuts., sweeping Cruciferae, 93, v; *P. nemorum* (L.) (N.-F.-D.); *P. flexuosa* (Ill.) (*sinuata* Redt. nec (Steph.)) (N.-F.-D.); *Aphthona lutescens* (Gyll.), quite common, general

sweeping and sometimes occurs in vegetable litter, throughout the fen, iii, iv, v, vi, vii, viii, ix; *A. coerulea* (Geof.), on *Iris pseudacorus* L. wherever they occur, vi, viii, ix; *A. venustula* Kuts., sweeping in 93, vi; *Sphaeroderma rubidum* Graëls, on thistle in Copper field, viii; *S. testaceum* (F.), on thistles, on Central drove, and in 93, 94, 104 and 105, viii; *Lythrararia salicariae* (Payk), usually by sweeping but sometimes in vegetable litter, on Copper field, Central drove, and in 92, 93, 94, 95, 104 and 105, iii, v, vi, viii, ix; *Ochrosis ventralis* (Ill.), sweeping (Gardner), v; *Crepidodera transversa* (Marsh.), sweeping thistles, 80, 93, 94 and 104, vi; *C. ferruginea* (Scop.), sweeping thistles, 94, 95, 104 and 105, viii; *Chalcoides aurea* (Geof.), on aspens and sallows, 93 and 94, v, vii; *C. plutus* (Lat.), on sallow, on Central drove and drove 5, vi; *C. fulvicornis* (F.), on sallows and aspens, on Central drove, drove 5, and in 93 and 94, v, viii; *Epitrix pubescens* (Koch), a single example on Woody Nightshade in 80, vi, it has also been taken by Dr. Massee, viii; *Chaetocnema concinna* (Marsh.), sweeping on Copper field, viii; *Psylliodes attenuata* (Koch), sweeping on Central drove, ix; *P. sophiae* Heikertinger (*cyanoptera* auctt. nec (Ill.)) (N.-F.-D.); *P. affinis* (Payk.), sweeping in 94, vi, viii; *P. cuprea* (Koch) (N.-F.-D.); *P. luteola* (Müll.), taken by Dr. Massee, viii; *P. picina* (Marsh.), not uncommon by sweeping and in vegetable litter, on Central drove, in Copper field, and in 94, 95, 104 and 105, iii, vi, vii, viii, ix, xi; *Cassida flaveola* Thunb., a single example swept in 92, and Mr. Gardner also has it from the Copper field, vi, vii, viii; *C. viridis* L., on *Mentha* in 94, vi, vii; *C. rubiginosa* Müll., on thistle, but not nearly so common as in some other localities, also in vegetable litter, on Copper field and in 93, viii, xi; *C. vibex* L., sweeping on Copper field (Gardner), x.

LAGRIIDAE

Lagria hirta (L.), an example was swept in 93, viii.

TETRATOMIDAE

Tetratoma fungorum F., in *Polyporus betulinus* Fr., in 105 and 108, x.

PYROCHROIDAE

Pyrochroa serraticornis (Scop.), a single example swept on Central drove, v.

SCRAPTIIDAE

Anaspis frontalis (L.), usually on hawthorn blossom, but sometimes by general sweeping, drove 9, Stewart's drove, and in 93, 94, 104, 105 and 107, v, vi; *A. regimbarti* Schils., usually on hawthorn blossom but has also been obtained by general sweeping, 105 and 107, vi; *A. lurida* Steph. (*subtestacea* Steph.), sweeping in Copper field (Gardner), vii; *A. maculata* Geof., on hawthorn blossom, in 105 and 107, v, vi.

ANTHICIDAE

Anthicus floralis (L.), in vegetable litter on Central drove and in Copper field, viii, x.

ADERIDAE

Aderus populnea (Panz), in partly decayed birch trunk (Crowson in litt. to Dr. Duffey).

ANTHRIBIDAE

Platystomos albinus (L.), a single example was taken by Mr. Gardner on a sugaring post at the junction of drove 5 and Central drove in the late afternoon, vii. The species occurs in the fungus *Daldinia concentrica* Ces. & de Not, but none has been noticed in the fen. However, the species is known to occur in Monks Wood which is a comparatively short distance away as the crow flies.

CURCULIONIDAE

Caenorrhinus aequatus (L.), on hawthorn, on Central drove and in 105 and 107, v; *C. aeneovirens* (Marsh.), beaten from birch in 108, vi; *C. germanicus* (Herbst), beaten from oak and hawthorn, and by sweeping, Central drove, in Copper field and in 104, 105 and 107, v, vi, viii, it has also been taken in vegetable litter (Gardner), iii; *C. nanus* (Payk.), sweeping in 94, vi; *Deporaus betulae* (L.) (N.-F.-D.); *Apion assimile* Kirby, in vegetable litter on Central drove, viii; *A. urticarium* (Herbst), on nettles just inside the fen entrance on drove 5, vi; *A. rufirostre* (F.), sweeping in 94, vi; *A. viciae* (Payk.), sweeping in the open places in the fen, vi; *A. dichroum* Bedel (*flavipes* (Payk.)), in vegetable litter on Central drove, x; *A. nigritarse* Kirby (N.-F.-D.); *A. carduorum* Kirby, on thistles throughout the fen, vii; *A. pisi* F., in vegetable litter on Central drove, iv; *A. striatum* Kirby, in vegetable litter on Central drove, viii; *A. spencii* Kirby, sweeping vetches in Copper field, vii, viii, ix; *A. vorax* Herbst, sweeping in 108, vi, vii; *A. simile* Kirby, on birch (Masse), viii; *A. violaceum* Kirby (N.-F.-D.); *A. curtirostre* Germ., sweeping in 93, 94, 104 and 105, viii; *Otiorrhynchus desertus* Rosen., in Copper field (Gardner), viii; *Strophosomus melanogrammus* (Forster), beaten from oak and birch on Central drove and on drove 2, v, x; *Barypithes araneiformis* (Schr.), very common in vegetable litter on occasions, mainly on Central drove, v, vii, viii; *Sciaphilus asperatus* (Bons.), common in vegetable litter on Central drove and in Copper field, viii, ix, xi; *Polydrusus pterygomalis* Boh., general beating throughout the fen, v, vi; *P. cervinus* (L.), general beating and occasionally sweeping, along drove 5 and in 92, and 93, vi; *Phyllobius oblongus* (L.), beaten from hawthorn blossom, 105, v; *P. pomaceus* Gyll. (*urticae* (Deg.)), on nettles wherever they occur in the fen, v, vi; *P. pyri* (L.) general beating, Central drove, drives 5 and 7, and along the Gt. Raveley drain; *P. virideaeris* (Laich.) (*pomoniae* (Ol.)), general beating, Central drove and drove 7, vi; *P. parvulus* (Ol.) (*virideaeris* auct. Brit.), (Gardner), vi; *Sitona regensteiniensis* (Herbst), (N.-F.-D.); *S. striatellus* Gyll. (*tibialis* (Herbst)), in vegetable litter on Copper field,

iv; *S. humeralis* Steph., sweeping in 92 and 93, vi; *S. lineatus* (L.), general sweeping and in vegetable litter, on Central drove, droves 3 and 5, and in the Copper field, 92, 93, 94, 104 and 105, iii, vi, vii, viii, ix, x, xi; *S. sulcifrons* (Thunb.) (Gardner), viii; *S. suturalis* Steph., in vegetable litter on Copper field, xi; *Phytonomus rumicis* (L.) (N.-F.-D.); *P. arator* (L.), on Copper field (Gardner), ix; *P. fuscocinereus* (Marsh.) (*murinus* (F.)), and *Lixus paraplecticus* (L.) (N.-F.-D.); *Rhynchaenus rusci* (Herbst), on birch, 105 and 107, viii; *R. salicis* (L.), on willows but is occasionally swept, drove 2 and in 93, v, vi, vii, viii; *Ramphus pulicarius* (Herbst), on willows in 92 and 93, viii; *Notaris scirpi* (F.), in vegetable litter on Central drove, ix; *N. acridulus* (L.), in vegetable litter on Central drove, and in 92, ii, viii, ix, x; *Dorytomus longimanus* (Forst.), and *D. melanophthalmus* (Payk.) (N.-F.-D.); *D. rufatus* (Bed.) (*rufulus* Bed.), quite common on willows along drove 5, viii, ix; *Tanyssphyrus lemnae* (Payk.) (N.-F.-D.); *Miccotrogus picirostris* (F.), in vegetable litter on Central drove, in Copper field and in 104, v, viii, ix; *Gymnetron antirrhini* (Payk.), a single example in an odd plant of *Linaria vulgaris* Mill., in 105, viii; *Mecinus pyraister* (Herbst) (H.F.F.); *Anthonomus inversus* Bedel, on hawthorn blossom drove 9, v; *A. pedicularius* (L.), a single example beaten from hawthorn not yet in bloom on Central drove, it is also recorded by Fryer (1914, *Ent. mon. Mag.*, 25: 111), v; *A. rubi* (Herbst) sweeping, 94 and 104, vi; *Nanophyes marmoratus* (Goeze), is extremely abundant on *Lythrum salicaria* L. wherever it occurs particularly in the Copper field, vi, vii, viii; *Stenocarus fuliginosus* Marsh., on Copper field (Gardner), ix; *Cryptorhynchidius lapathi* (L.) (N.-F.-D.); *Cidnorrhinus quadrimaculatus* (L.), very common on nettles wherever they occur, v, vi, viii; *Poophagus sisymbrii* (F.) (N.-F.-D.); *Ceuthorhynchus assimilis* (Payk.), on Cruciferae in 92, v; *C. erysimi* (F.) (N.-F.-D.); *C. contractus* (Marsh.), on Cruciferae in 92, v; *C. timidus* Weise (N.-F.-D.); *C. quadridens* (Panz.), sweeping in 94, but a single example was obtained in vegetable litter on Copper field, vii, viii, x; *C. viduatus* (Gyll.), on *Lythrum salicaria* L. (Purple Loosestrife), and a few odd specimens in vegetable litter on Copper field, this insect is usually recorded from *Stachys palustris* L. (Marsh Woundwort), and though this plant occurs almost as commonly in the Copper field as *L. salicaria* the beetle was most definitely swept from *L. salicaria*, vii, viii, ix; *C. rapae* Gyll. and *C. punctiger* Gyll. (N.-F.-D.); *C. melanostictus* (Marsh.) (H.F.F.); *C. asperifoliarium* (Gyll.) (Masse), viii; *C. chrysanthemi* Germ. (H.F.F.); *C. litura* (F.), *C. floralis* (Payk.), *C. pyrrhorhynchus* (Marsh.) and *Amalus scortillum* (Herbst) (*haemorrhous* (Herbst)) (N.-F.-D.); *Rhinoncus pericarpus* (L.), on *Rumex*, in Copper field, vii; *R. inconspectus* (Herbst) (*gramineus* (F.)), *R. perpendicularis* (Reich.) and *R. castor* (F.) (N.-F.-D.); *Phytobius quadrituberculatus* (F.) (H.F.F.); *Curculio* (s.gen. *Curculio*) *rubidus* Gyll., on birch (Masse); *C.* (s.gen. *Balanobius*) *salicivorus* Payk., on willow on drove 9, v; *Magdalis barbicornis* Lat., swept off Rosaceae on Central drove (Gardner), viii; *M. ruficornis* L., swept on Copper field (Gardner), viii.

COLEOPTERA FROM THE VICINITY OF THE FEN.

A certain amount of sweeping has been done walking from the parked car at the bottom of Ramsey Heights to the fen gate and whilst most of the species thus taken have also occurred inside the fen there are several which as yet have not been found beyond the fen gate. These are listed below as a matter of interest.

With one exception these have been recorded by Mr. A. E. Gardner.

CHRYSOMELIDAE

Podagrica fuscicornis L., swept off *Malva* sp., vii, viii.

CISTELIDAE

Isomira murina L., beaten from cultivated rose, vi.

CURCULIONIDAE

Apion malvae F., swept from *Malva* sp., viii; *A. aeneum* F., swept from *Malva* sp., viii; *A. radiolus* Kirby, swept from *Malva* sp., viii; *Gymnetron collinum* Gyll., swept from *Linaria vulgaris* Mill, viii; *Ceuthorhynchus sulcicollis* Payk., swept from *Sisymbrium officinale* (L.) Scop., vii, viii.

SCOLYTIDAE

Hylesinus fraxini Panz., flew onto roof of car in the village, iv; *Pteleobius vittatus* (F.), also flew onto roof of car in the village, iv.

FIELD OBSERVATIONS ON SOME WEST AFRICAN HYMENOPTERA

By B. J. MacNULTY

Whilst stationed in Nigeria, West Africa, I made, over a period of four and a half years from 1954-1958, a number of casual observations on the behaviour of some indigenous Hymenoptera; in two instances I was able to observe the behaviour in more detail and over a longer period. In the present state of our knowledge of West African Hymenoptera it seems that these observations may be worth recording. Where close observation was possible I have decided to quote my complete notes, rather than selected portions or the conclusions drawn from them, since it is the original observations that are of prime importance. They have, however, been rewritten in parts to render them in recognisable English.

The Hymenoptera have been named by Dr. I. H. A. Yarrow, of the Department of Entomology, British Museum (Nat. Hist.), to whom my thanks are due. The identifications are, in some instances, provisional, as it is understood that the nomenclature is in urgent need of revision; these instances I have indicated in the text by an asterisk.

Hemipepsis species

This dull, metallic blue wasp can often be seen in Kano, hawking low over the ground in a rapid zig-zag flight. At a brisk trot it can be followed for about 30 yards, after which it is usually too far ahead to be kept in sight. On one occasion, however, I was fortunate enough to see one of these wasps drop to the ground about 15 yards from me. For a few moments this wasp seemed to search at random around the point at which it had alighted, and then it clearly recognised some sign, for it started to move slowly forward with quivering antennae. Suddenly, a trapdoor spider sprang half out of its hole almost on the wasp's head. The wasp withdrew rapidly and then came forward again quickly. This was repeated two or three times until the wasp was in a position to be firmly grabbed by the spider's legs whilst remaining out of reach of its jaws. As the spider attempted to seize the wasp, it was suddenly jerked out of the hole and flung over the wasp's head so that the wasp was left between the spider and the hole. This happened so quickly that it was not possible to see whether the wasp actually grasped any part of the spider. The spider tried desperately to return to the hole but the wasp rolled it on to its back and paralysed it without difficulty.

The spider was dragged back to the hole and left at the side whilst the wasp proceeded to clean and further excavate the hole bringing several loads of earth to the surface. After ten minutes, the wasp took the spider below ground and remained there for an hour and a half

before returning to the surface. Subsequently, the spider was dug out of the ground from a depth of between four and five inches, and the wasp's egg was found to be laid on the abdomen. The spider has since been identified as *Lycosa (Hogna) sp.*, near *spencei* Pocock, it is a female and, unfortunately, immature.

Sceliphron spirifex L.

A bright black and yellow wasp which is one of the commonest solitary Hymenoptera in West Africa. It frequents dwelling houses and I cannot recollect having seen its cells anywhere else. It prefers a dark corner and rough stone walls for its cells, although it will use wood or any other substrate where necessary; groups of cells have been found in cupboards and even in drawers. The narrow cells which are about 20 mm. long, two-thirds the length of the adult insect, are arranged in rows, the longer side of each cell adhering to the side of the next cell, but each one having a separate wall; they are built of mud, usually containing a high proportion of sand. Rows contain about 10 to 15 cells on an average, but I have seen as many as 30.

When making the cells, the wasp brings a ball of mud held in its front legs to the spot selected. On alighting, it works the mud with its mandibles and then begins to beat its wings furiously, producing a high pitched whine whilst it works the mud into the walls of the cell. It appears to take the mud into its mouth, add a liquid, and work the mixture into a cell wall with its mandibles. The extremely rapid wing-beat and the whine always accompany the making of the cell wall. Whether the whining noise is entirely due to the rapid wing-beat, or partially or entirely to some other organ, is not known. The cells are filled with small spiders, and usually contain between 50 and 60, apparently of several species.

The mud used for cell building is collected from suitable puddles or stream banks; whilst collecting the mud, the same high-pitched whine is emitted as in cell building.

Synagris calida L.

This easily recognised black wasp with the bright red tail is also common throughout Nigeria. It is parasitic on more than one species of lepidopterous larvae but in the cells I opened, pyralid larvae were commoner than those of other families. The larval cell is approximately 10 mm. \times 35 mm., which is slightly bigger than the dimensions of a cylinder needed to enclose the adult wasp minus the wings, is built from mud, and is situated in as dark a place as the wasp can find. Except for needing a dark place, the insect does not seem to mind where it makes its cells, and dwelling-places and their surroundings frequently provide suitable cover. I have found cells, which are usually built singly, in old discarded metal ammunition boxes, under steel cylinders stacked lengthways on the ground, on the steel with the top just touching the earth, on walls inside a windowless hut, and on articles stored therein, under house roofs, access being obtained through ventilation grills inside

the house, and on the backs of furniture stood close to the wall. The wasp is not aggressive and can be readily observed in suitable places though usually the situation of the cells makes viewing difficult.

Like the previous species this wasp vibrates its wings and emits a high-pitched hum whilst actually building the cell wall. The cell is built section by section, building starting from bottom end.

Rynchium marginellus F.

This dark red-brown wasp with bright yellow markings down the sides of the abdomen and thorax is one of a number of closely related species distinguished by differences of the yellow marking and genitalia. The nomenclature is somewhat confused and little is known about the true distribution of the individual species. Specimens taken from northern and southern Nigeria proved to be different species, the present being that occurring in the south.

I had often observed this wasp hawking over low-growing plants, particularly *Dissotis rotundifolia* (see Hutchinson & Dalziel; Colonial Office, 1928); it may be that the wasp shows up well against this plant rather than that it is particularly addicted to it. On one occasion I noted one of these wasps excavating a hole in the ground but, at the time, I was not able to watch it for more than five minutes.

One afternoon towards the end of my stay I noticed one of these wasps, bearing a large green pyralid larva between its legs, hovering over a hole in the window frame. I will now quote directly from my notes made at the time:

- 14.30+ The wasp was observed approaching the hole bearing a green larva (probably a pyrale) between its legs. It dragged the larva into the hole and pushed it roughly into position curved round the circumference of the hole. At this point I made a movement which disturbed the wasp and it flew off.
- 14.40 No sign of the wasp returning; broke off observation.
- 15.06 The wasp was back at the hole. It was obvious that at least one more larva had been added. The wasp kept moving around in the hole, stopping at intervals and pressing inwards with its abdomen. Was it egg laying or just on guard?
- 15.17 The wasp had now been quite still, facing the opening for more than five minutes. I moved closer to try to see what was happening. The wasp flew off. The larvae in the cell had been pressed into a compact mass.
- 15.30 The wasp returned with a mud ball. This it worked round the sides of the hole close to larvae.
- 15.33 The wasp flew off.
- 15.37 The wasp returned with more mud which it worked all round side of hole gradually closing a cap over the cell.
- 15.39 The wasp departed.
- 15.43 The wasp returned with fresh mud, which it worked into the cap on the cell.
- 15.50 The wasp departed.

†All times given are Nigerian time.



1 *Synagris cutida* L. 2. *Belonogaster tubitus* Kohl. 3. *Scertiphron spirifer* L. 4. *Belonogaster juncus* F.

- 15.54 The wasp returned with more mud. Last trip?
 15.56 The cell was now completely closed, but the wasp continued to add mud round edges and over the surface of the cell.
 16.03 The wasp left and had not returned by 17.00. The sealed surface of the cell appears to be white and not at all mud-like.

Two days later I opened up the cell and removed the contents. The cell contained nine lepidopterous larvae all of the same species and one minute wasp grub. Surprisingly, there was a second cell behind the first one; it contained four lepidopterous larvae apparently of the same species as in the first cell and a grub about half grown. The contents of each cell were transferred to a small test tube and sealed with a cork and blotting paper. The larger grub died within two days. The second grub survived for five days and then died of a fungus attack; it then appeared to be about half grown. Thus, assuming that growth was normal during the whole period and that the fungus attack was rapid, the maximum period of the larval instar would be about ten days.

Belonogaster dubius Kohl.*

A large grey wasp whose nest is attached to a branch of a tree. Most of the nests I have seen have been attached to *Casuarina* trees, and always towards the ends of the branches. As the nests are usually attached to branches that are frail and whip easily in the wind, it seems likely that they are so sited that no matter how the branches sway, the nest will not be swept away by contact with a nearby branch.

It was possible to observe a nest of this wasp almost daily for five weeks, sometimes for many hours at a time, and intermittently thereafter. A fairly complete picture of the growth of a colony was made. All stages, except the first starting, of the nest were observed.

The nest is usually built 20-30 or more feet from the ground but in the present instance it was only six feet six inches from the ground, at the end of a long *Casuarina* branch clear of all obstructions overhanging a little used bunker on the local golf course. The original notes are quoted below, the only alterations made being those necessary to render them in reasonable English. Any explanations added during the preparation of this paper are shown in square brackets. When observations become intermitted, notes are separated by a broken rule.

1st August 1954.

Nest first seen. It consists of two main cells with one, possibly two, subsidiary cells, and a base for many more (see Figs. 1 and 2). [The nest consists of a flat plate suspended on a loop of papier mache like ribbon attached at its centre to a thin stiff short black cylindrical stalk which is itself stuck very strongly to the

TABLE I

Showing the development of nest of *Belonogaster dubius* Kohl., August — September 1954

Date	No. of wasps at nest	Cell No																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AUG 2	3	FG	$\frac{3}{4}$ G	$\frac{1}{2}$ G	$\frac{1}{3}$ G	X																			
3	3	C																							
5	3		C																						
8	3		FGn	FGn	$\frac{1}{2}$ G	Egg*	X	X	X	X															
10	3		C	FG	FG							X													
11	3				C																				
12	3				C(11)																				
13	3	H																							
14	3						$\frac{1}{2}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{2}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
15	3	H					$\frac{1}{2}$ G	$\frac{1}{2}$ G	$\frac{1}{2}$ G	$\frac{1}{2}$ G	FGn								$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
16	3						$\frac{3}{4}$ G	$\frac{3}{4}$ G	$\frac{3}{4}$ G	$\frac{3}{4}$ G	FGn	FGn	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
17	3	H					FGn	FGn	FGn	FGn	FGn	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
18	3	H					C(11)												$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
19	3							FG	FG	FG	FG								$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
20	4	E(17)							C(13)	C(13)															
21	4		H				C(14)			C(14)															
22	5	E(17)																							
25	5																								
29	8		E(19)	E(18)	E(17)		H					FGn	FGn	FGn	FGn	FGn	FGn	FGn	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	$\frac{1}{3}$ G	
SEPT 2	7					CRUMPLE MISSING		H		H															
3	7						H	H	H	H		CELL EMPTY													
4	7									H		CELL REMOVED													
5	8						E(18)																		
6	9											CELL REMOVED													

G — Grub one-quarter grown

FG — Grub full-grown

FGn — Grub almost full-grown

X — First feed at cell, or cell first lengthened

Egg — Egg in Cell

Egg* — Wasp observed laying egg

C — Cell capped

E — Imago emerged

H — Hole in side of cell

Underlining denotes end of a stage

Figures in parentheses indicate number of days occupied by stage just ended, (18) equals 18 days; with a star thus (18*) the larval period is indicated

branch (Fig. 1). On the underside of the flat plates are the foundations of 20-30 cells (Fig. 2). These are extremely shallow and are not touched until an egg has been laid in them and the grub has hatched. As the grub grows, so the cell is enlarged by building up the side walls. The final length of the cell being about 3 cms. The cells originally described as "main" were nearly full length; those described as subsidiary had only been slightly extended.

The base of the nest was completely laid down when nest was found, and was not subsequently altered except on one occasion —see notes for September 16th and October 10th.]

Two wasps were on the nest settled on the two large cells; one of them was regurgitating a fluid and using it to make a sort of papier-mâché with which it lengthened the largest of the cells.

2nd August.

- 10.15 There were two wasps on nest, one resting, the other feeding grubs by regurgitation. The feeding fluid has the same appearance as that used for making cells.
- 10.25 One wasp departed.
- 10.40 A wasp arrived at nest carrying a ball of semi-solid paste which looked a little like honey. The paste was chewed and worked with the mandibles and fed quickly to the grubs.
- 10.45 A third wasp arrived carrying what appeared to be a dumb-bell of waxy honey. This it shared with the one that had never left the nest. Both chewed and ate this; the wasp that had brought the food back regurgitated and started to feed the largest grub. After a while the smallest grubs were fed (those in cells 3 and 4). The grubs were excited by the wasp which trembled all over its body and tickled the larval head with its forelegs. At this stimulation, the larva extends its head eagerly. The larva is white and shapeless, with a yellow plate on front dorsal surface and a slit-like mouth (Fig. 3).
- 11.15 The feeding of the grubs was continuing, but was slow and intermittent. By this time it was found possible to distinguish between the three wasps.
- 11.37 The wasp that had not previously left the nest (Wasp A), flew off. This wasp had taken no part in feeding the grubs, but appeared to act as a guard and to remove excrement from the end of the cells.
- — — — —
- 12.10 All three wasps at nest resting.
- — — — —
- 14.40 A large, clear, white, semi-transparent cap, not opaque like the rest of the cell, nor so thick, has been spun over the end of the largest cell. There is a large hole toward the base of the cell. The grub in this cell received the most food this morning. Two

wasps present (A and B). One is on guard (A), the other is extending the sides of cell 2.

- 14.43 Wasp B stopped work. Cells 3 and 4 have both been extended.
- 14.48 Wasp C arrived carrying small amount of wax (?) in its mandibles. It at once started using this wax-like material to extend the sides of cells 2, 3 and 4. (Fig. 4 shows plan of cells).
- 14.50 Guard Wasp A, which till now had been resting quietly on top of the largest cell, flew off.
- 14.53 Wasp C stopped extending the cells and rested.
- 14.54 First Wasp B then Wasp C fed the grub in cell 2.
- 14.56 Both Wasps (B, C) resting. The grub in cell 2 keeps extending its head from the cell as if expecting to be fed.
- 14.58 Wasp B left. Wasp C regurgitated and fed grubs in cells 2, 3, 4 and 5. The grub in cell 1 is very active and keeps coming right down into the cap. It appears to still want to feed, but is sealed off. Is a Queen made by further feeding? Wasp C is now acting as guard, and gives a lot of attention to cell 1, continually crawling over it and tapping it with the antennae.

I touched one of the cells with a pencil point. The wasp faced the pencil point and froze in a threatening attitude.

- 15.05 Wasp B returned, and immediately started to strengthen the cap on cell No. 1, in which the grub seems to have swollen so as to entirely fill cell. The strengthening is put on in the form of darker threads on the white cap. I am rather close to the nest. Both wasps (B and C), are uneasy, and appear to check on each others' identity frequently.
- 15.10 Both wasps resting.
- 15.22 One wasp stroked its back vigorously with rear legs, then fed the grub in cell 2 by regurgitation, then tried at cell 1—then returned to cell 2. The other removed waste products from the cell, working all round edge of grub with the mandibles—[sometimes a small hole is cut near the base of the cell and the rear end cleaned up.]
- 15.25 Observation ended by heavy rain.

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3rd August.

- 12.50 Wasps B and C present. Cell 2 is complete and should be closed by this time to-morrow. One wasp is on guard, the other is starting to extend fresh cells. It regurgitated a black ball which it used for building. The capped cell (No. 1), is all marked with strengthening lines which appear brownish; there is still a large hole near the base.

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- 16.05 Wasps B and C present. The hole near the base of No. 1 cell has been sealed up since the previous observation at 12.50.
- 17.25 One wasp, B, present.
- 17.35 Wasp C returned. Both wasps quiet.
- 18.00 Still only two wasps present, both resting.

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4th August.

12.55 All three wasps, A, B and C, present. All were very wary; although all were in the rest position when I approached, they took up defensive attitude immediately the branch was touched.

After the branch had been touched several times, Wasp B ejected two large drops of regurgitated liquid which fell to ground.

13.05 All are quiet and resting.

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5th August.

12.55 Cell No. 2 is capped. The grubs in cells 3 and 4 are about half grown; that in cell No. 5 a quarter grown. The rest are only very slightly developed.

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17.15 All three wasps present, two at rest, one on guard.

17.20 One wasp left nest and went round tall reed-like grasses collecting what looked like very small bits of resinous matter at grass nodes. Stayed hardly more than 2-3 seconds at each node.

17.25 The wasp returned to nest. All rested.

6th August.

12.50 Very dull day. Only Wasps B and C present. Hardly any activity.

7th August.

14.30 Very bright afternoon. All three wasps present feeding grubs by regurgitation. Very busy all day, working at general strengthening of the nest, especially the arch at the top. Wasps were actively foraging all the afternoon, with usually two wasps at a time away for periods lasting between 5 and 30 minutes. Only small amounts of food were brought back each time and the feeding lasted for not more than five minutes on each occasion. This routine was still being followed at 18.45, when it was almost too dark to see.

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8th August.

10.10 Wasp A is extending cell 3, and may be preparing to cap it. Cell 4 is now nearly full length, and cell 5 is half complete.

10.20 Wasps were alarmed, probably by my close scrutiny. Wasp B arrived and started to strengthen main stalk support.

10.25 Wasp A fed grubs in all cells with very small amounts of food by regurgitation.

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15.20 Wasp A laid an egg in Cell 6.

15.40 Wasp B arrived with small ball of black stuff, which was well chewed, then regurgitated and fed to largest grub, that in cell 3. Wasp A fed grubs in other cells.

- 15.47 Wasp C arrived and fed Wasp A by regurgitation. Wasps A and C then fed grubs in all cells going from one to another, starting at cell 6.
- 15.49 Wasp B left.
- 15.53 Wasp C left. Wasp A busily stroked abdomen with legs and wings for about three minutes. Wings were then pressed against abdomen and stroked vigorously with legs. Then it went into the rest position but was still easily alerted.
- 16.06 Wasp B arrived with more black stuff which it chewed and then fed to some of the grubs by regurgitation. Wasp A followed Wasp C round and took some food back from the biggest grubs.
- 16.12 Wasp C arrived with what looked like a yellow waxy product. Wasp A took nearly all this at once and swallowed it. Then fed grubs in smaller cells, beginning with largest of these. (Found a dead wasp eight feet from nest. It was quite stiff—was this a stranger that had been killed?).
- 16.32 Wasp B left the nest.
- 16.36 Wasp B returned with black stuff, with which it extended the small cells behind cell 5. Cells 3 and 4 are ready for capping, but the grubs are a bit small.

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9th August.

Heavy rain all day.

10th August.

- 10.05 Wasp A present. Cell 3 is freshly capped. This cap was made much more slowly than first two, the process extending over two days at least. Cells 4 and 5 are ready for capping.
- 10.40 Wasp B came back to nest with greenish mass in jaws (looks too stiff for honey). It could be a seed or piece of fruit; the wasp appears to be injecting saliva into it.
- 10.47 Wasp B fed grubs with green mass; that in cell 5 first, then the one in cell 4. The food mass now looks like honey with much pollen and wax.
- 11.15 Wasps A and B resting.
- 12.10 Wasps A and B resting.

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- 17.07 Wasp A resting. Three more cells have been extended in the row behind cells 4 and 5 (see Fig. 4).
- 17.09 Wasp B returned and fed Wasp A with a large ball of dark substance.
- 17.18 Wasp A fed grub in cell 5 whilst Wasp B rested. During the resting period wasps clean themselves. They first hold on to nest with back and centre legs; the forelegs are then used to clean mandibles, mouth, antennae and head. The wasp then grips cell with mandibles and holds on with the forelegs whilst using the other legs to cleanse body and wings. Centre and back legs are cleaned by rubbing against each other.

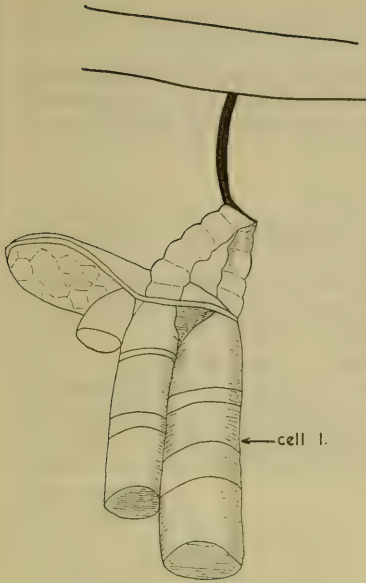


Fig. 1. End on view of nest.

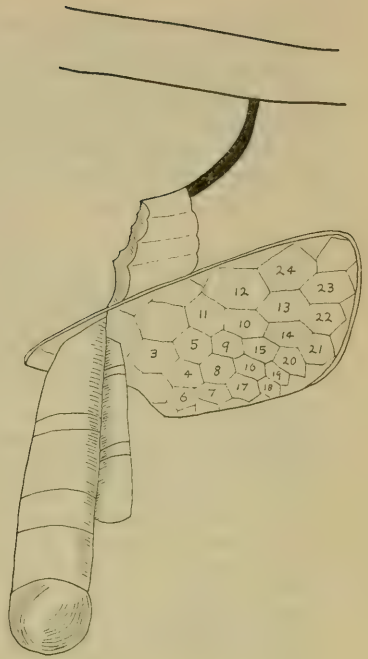


Fig. 2. Broadside view of nest.
(numbers indicate approximate positions of cells eventually developed. Cell 1 is capped)

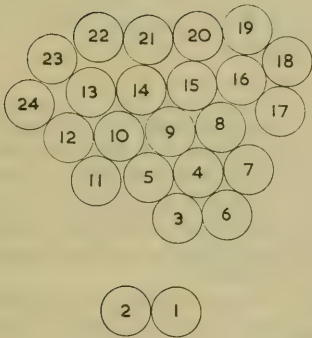


Fig. 4. Plan of cell mouths from below showing relative positions (not to scale).

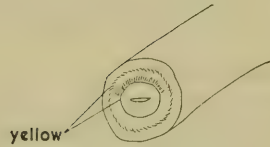


Fig. 3. Showing appearance of larval head in cell mouth.

- 17.23 Wasp A again fed grub in cell 5 (a single feed lasts usually 30 seconds) and then fed the one in cell 10.
- 17.25 The grub in cell 5 was fed, and then the one in cell 8. (Was cell 4 missed although looked for?).
- 17.28 Wasp B fed grubs in cells 4, 5 and 6 by regurgitation and then left. Wasp A fed grubs in third row of cells (6-10). Cells 1 and 2 (capped) are clearly separate from main block of cells to which they are joined at top and bottom only.

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11th August.

- 12.23 Wasps A and B at nest. Cell 4 is capped with a layer of pure white material, which is very thin.
- 12.24 Wasp C arrived and wasp B left. Wasp C fed the grubs in a few of the newer cells and then strengthened the cap on cell 4 with a layer of material which rapidly became yellow.
- 12.26 Wasp A fed grubs in the smaller cells by regurgitation.
- 12.27 Wasp C fed grub in cell 5, then the one in cell 11 (which is new).
- 12.29 Wasp A started to extend bases of fresh cells, thus expanding the used portion of nest. Wasp B returned with blackish material. This it chewed for a long time; this material seems to require more working on than the yellow.
- 12.35 Grub in cell 10 fed by Wasp C.

12th August.

- 17.35 Cell 5 has been closed.

13th August.

- 17.55 Cell 1 has obviously been opened, looked at and resealed. All three wasps present. Cell 10 is the largest, and the grub therein the most active. Cells 6-9 are next in order of development, then cells 11-16.

14th August.

- 16.00 There are two wasps on nest. Cell 10 is nearly two-thirds complete, and cells 6-9, between one-third and one-half completed. Cells 11-16 are smaller, but growing rapidly.

15th August.

- 12.00 Cell 10 is almost complete. Cells 6-9 are half complete. Grubs in cells 7-8 seem different, being entirely white with no yellow or black. The front, where the mouth should be, is jellylike. The grub in cell 8 has a black dot to the right of the mouth; the grubs appear to be fatter. There is some sign of a faint black mark on top edge of the grubs where the yellow plate should be. Cell 1 has a large hole half-way up the side.
- 16.30 The hole in cell 1 has been resealed. Wasps A and B present. Grubs in cells 7 and 8 both appear normal. [It is suggested that this change in appearance, noticed yesterday, marks an ecdysis.]

16th August.

- 18.45 Wasps A and B present. Cell 10 is nearly complete. Cells 6-9 are well advanced. Cells 11, 14 and 17 are beginning to grow visibly. All formed cells now have an occupant. The outer row of seven cells each appear to have an egg. Again there is a hole in the side of cell 1; a dark object can be discerned through the cap at the bottom of the cell.

17th August.

- 17.15 Wasps A and B present. Cell 1 still has a hole in the side. There is also a small hole in the cap of the cell; a reddish-brown wasp body can be seen inside. Cells 6-10 are nearly complete. Cells 11 and 12 have not advanced much. Cells 14 and 17 are about half complete.

18th August.

- 17.36 Wasps A and B present. Cell 6 has just been capped; The wasps are still fussing around it. Cell 1 as yesterday; through the hole a leg can be seen moving.

19th August.

- 12.45 The original hole in the side of cell 1 has been enlarged. There is another hole on the other side of the cell. The hole in the cap is unchanged. Within the cell a wasp is fully formed, with wings fully expanded. Wasp A, though resting normally on nest, is very alert and positively aggressive, tending to fly at any strange object held near the nest.
- 12.53 Wasp B arrived carrying a green mass which was nearly all taken by Wasp A. Wasp A consumed the green stuff and then regurgitated and fed grubs. Cells 7-10 and 14 and 17 are nearly complete.

20th August.

- 13.10 A wasp has emerged from Cell 1 (Wasp D). Practically all signs of the cell have been removed. The newly-hatched wasp is larger than the others. Cell 9 has large white cap on which Wasp A is putting strengthening lines. Wasp B arrived and fed grubs by regurgitation.
- 17.50 Two wasps at rest. Cell 8 is half capped. No work is being done. One wasp flew off and rested in the branches of the tree; it moved around two or three times without apparently doing anything. Wasp B arrived. Grubs in cells 8 and 10 were very restless and appeared to want food.
- 18.23 The wasp resting in tree branches returned to nest.

21st August.

- 15.30 Cells 7-10 have all been capped. The largest wasp (D), is on guard. Cells 14 and 17 have made no progress.

15.34 Wasp B arrived and started strengthening caps in cells 7-10.

There is a small hole in cap of cell 2 through which a freshly hatched wasp can be seen. The eye parts are blackish, whereas in the emerged adult they are brown.

16.00 Wasp A arrived with black material, this it chewed—but did not feed grubs.

22nd August.

Very wet. Wasp from Cell 2 emerged and rested quietly on cell.

23rd-24th August.

Too wet to observe nest.

25th August.

13.20 Three wasps, A, B and D, present. Cell 8 is empty. (Did grub die?)

13.25 Wasp A left nest. All wasps are very busy feeding grubs. Cells 11, 12, 14 and 17 are nearly complete, but others are catching up. Cells 18-22 are developing fast.

29th August.

Wasps have emerged from cells 3, 4 and 5. That from cell 5 is a cripple, as wings did not fully expand. Cells 14 and 17 are capped. There is a hole in the cap of cell 7. (It is no longer possible to distinguish wasps accurately.)

The grub in cell 16 succeeded in seizing food from a passing wasp and fed itself.

Cells 18-24 make up fifth row of cells.

31st August.

No change—there is still a hole in the cap of cell 7. The cripple is on guard with four other wasps.

2nd September.

The cripple has vanished. Three wasps are on the nest. There are holes in cells 7 and 10. Cells 12 and 16 are capped.

3rd September.

Cells 6, 7 and 9 have a hole in each. The hole in cell 10 has been resealed. The grub has vanished from cell 11. Cells 12-17 are all capped. Cells 18-23 are half completed.

4th September.

Cell 11 has been removed. Cell 10 again has a hole in the side wall. Cells 18-23 are almost complete.

5th September.

Three wasps are at work eating the walls of cell 6 from which a wasp has just emerged. The hole in cell 10 has been resealed.

7th September.

There are three wasps at work. Cell 6 has completely vanished. A wasp has emerged from cell 9, which has been almost completely eaten. There is again a hole in the side of cell 10.

8th/15th September inclusive.

Very heavy and continuous rain.

16th September.

Nest has been completely destroyed by rains, only the little black stalk is left. There is one wasp at rest on a tree stump close by.

At this point the nest was considered finished and no further visits were paid until the beginning of October when the site was visited more or less by accident.

4th October.

The nest had been completely rebuilt on the old stalk. Two cells are capped and one is ready for capping. There are four wasps working. There are six cells, about a quarter developed, and bases for another twenty-five.

7th October.

5.25 One wasp present. There are now three cells capped. Five have outside walls complete with grubs two-thirds to three-quarters grown. In four more the grubs are half-grown. The remainder (about 25) appear to have a very young grub or an egg in them.

5.30 A second wasp arrived.

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I was absent on tour until 2nd November. When I visited the site it was noted that the end of the branch of the *Casuarina* tree and the attached nest had vanished. The branch overhung a bunker on the golf course. What happened seems obvious.

The main observations have been abstracted as a table (Table I) from which the following conclusions can be drawn. The life cycle varies between 30 and 41 days from egg to adult. The egg seems to hatch fairly quickly probably within a day. The cell at the beginning is so small that as soon as the feeding of the grub begins, the cell walls are extended also. The time between first feeding or first extension of cell wall till the time the cell is capped varies from 11 to 22 days, depending on weather and food supply. In the first part of August until the 19th, the days were fine and there was little rain, but in the last 10 days of August and most of September, there was considerable rain and the opportunity of foraging was thus cut down. The larval stage took about 11 days in the early part of August, but as long as 22 days during the heavy rains. The pupal period varies from 16 to 19 days, with 18 days as the more usual.

It appears that the wasps cut an observation hole in the side of the cell, four to five days before the emergence of the adult; this hole seemed to be resealed and re-opened daily. Is this to remove the pupal skin which might otherwise interfere with the expanding of the wings?

At the time the observations on the nest were made, the food of the wasps was unknown. Subsequently they were found to prey on the lepidopterous larva, *Olapa travatensis* Holland. This larva is gregarious, black and hairy, and feeds in colonies of up to one hundred individuals under the leaves of a species of tulip tree. The wasps drag individual larvae from the colony, slit them up the middle and take out the insides, leaving the skin almost completely clean. This was undoubtedly the green or yellowish food brought to the nest. Whether this was the only larva preyed upon is not known. Certainly food of other colour was also brought to the nest. There appears to be no difference between material fed to grubs and material used for building cell walls, the wasp proceeding from one operation to the other indiscriminately, apparently using the same semi-liquid material.

The cell walls themselves are deep cream in colour but towards the bottom usually have bands of reddish and/or black.

When they are not working, either tending the grubs or extending the cells, the wasps on the nest adopt three different attitudes, that of resting, that of guarding, and the alarmed or aggressive attitude. At rest they lie, usually along a cell, with head towards the top of the nest, legs bent with body touching the cell, and wings folded over the back. In the guard position the wasp stands toward the top of the nest, facing the cell mouths (bottom of nest), wings outstretched so that forward edges are in a single straight line, and wing tips slightly raised above line of the body. In the aggressive position, the wasp faces the intruder with body raised as high on the legs as possible, and wings arched slightly back and raised at an angle of about sixty degrees to the body. When provoked sufficiently, it will fly at the aggressor, but only if other wasps are present at the nest; even so, it does not appear to attempt to sting, but merely frighten with a show of force.

Belonogaster junceus F.*

This blue-grey wasp has dark smoky wings with a bright steel-blue reflection. The nest is similar to that of the previous species generally smaller but whiter, the cell walls being dead white. I have never found them anywhere but suspended from ceilings of porches or rooms, and only when these are white; it is difficult to imagine where these nests were made, prior to the advent of stone buildings in West Africa. As the nests are high up and thrive mainly in porches attached to public buildings, it is difficult to make close and frequent observations. As with the previous species, the nest hangs from a single black stalk, about three-eighths of an inch in length, attached to the ceiling. The nest is started by a single wasp working alone, and the stalk takes about three to four days to complete. A simple base is then made and a single cell is started; when the grub in this is approximately half-grown, a

second is started. The grubs are fed by regurgitation as in the previous case.

The species preys on web-spinning spiders, whether on a single or on numerous species is not known. The method of taking the prey would seem to be highly specialised, and I only saw it take place on one occasion. The wasp hovered slowly up and down before the spider's web, getting closer until it just touched the centre of the web with its fore-legs or possibly with its antennae. The spider immediately ran from the hide into the middle of the web where it remained motionless. The wasp, which had continued to hover up and down before the centre of the web, plucked the spider bodily from the web using its mandibles and forelegs. Carrying the spider, it then flew a few feet away to a suitable grass stem where it alighted and consumed the spider, all excepting the legs.

This concludes the observations I was able to make. They were originally intended as the foundation of a more thorough study, but time was not available. It is hoped that what has been done may encourage some other entomologist to extend and develop field work on this group of West African insects, about which we still know so very little.

LARVAE OF BRITISH LEPIDOPTERA NOT FIGURED BY BUCKLER

PART VI

Compiled and illustrated by G. HAGGETT

Ortholitha mucronata Scopoli Lead-belle.

Although both Lempke (1949, *Entomologist*, **82**: 1) and more recently Fletcher (1953, *Ent. Gaz.*, **4**: 225) have clarified the status of moths that formerly passed as the one species *plumbaria* F. (*palumbaria* Schiff.) there is much confusion elsewhere in the British literature. That this still persists is due partly to the contradictory synonymy of past check-lists, and partly to the inadequacy of material from the wide ranges covered by both species. In *Check-list of British Insects* 1945, p. 105, Kloet and Hincks show *plumbaria* F., *umbrifera* Prout and *palumbaria* Schiff. to be synonyms of the one species, *mucronata* Scop. According to Cockayne (1940, *Proc. S. Lond. ent. nat. Hist. Soc.*, **1939-40**: 59-61) Prout was satisfied that *mucronata* Scop. and *palumbaria* Schiff. were synonyms of *plumbaria* F. and Cockayne, accepting that decision, recognised *umbrifera* Prout as the second species and proposed *scotica* Cockayne as a third. Tams and Cockayne followed the same nomenclature in their treatment of the species in 1941 (*A.E.S.* **5**, No. 38), still referring to *plumbaria* as *mucronata*. Allan (1949 *Larval Foodplants*) and Heslop (1947, *Indexed Check-list of the Brit. Lep.*, p. 16) both show *plumbaria* and *mucronata*. to be synonymous, and De Worms in a summary (1951, *Ent. Gaz.*, **2**: 158) does the same. In his latest attempt (1960, *Ent. Gaz.*, **11**: 173), Heslop shows *umbrifera* as a synonym of both *mucronata* and *plumbaria* and retains the popular name of Common Lead-belle for true *mucronata*—which is unfortunately the less common of the two species; I shall follow Edelen and use the name Lead-belle for *mucronata*.

Mr. D. S. Fletcher succinctly summed up the position in a letter to me and he has given me leave to quote—"We have two species in Britain, *Ortholitha mucronata* Scopoli and *O. plumbaria* Schiff.; both species occur widely on the continent of Europe and both display similar patterns of variation. Not surprisingly both have collected a considerable number of varietal and aberrational names, some of which are in use and some are merely synonyms. In Britain the populations of *mucronata* occurring in Scotland are known as *O. mucronata* subsp. *scotica* Cockayne: those occurring in the southern half of Britain are known as *O. mucronata* subsp. *umbrifera* Prout. *Scotica* was originally described as a species, but it has now been shown to be merely a form of *mucronata*".



Ortholitha mucronata s.sp. *umbrifera* Prout. Figs. 1-5 from Caernarvonshire N. Wales and 6-10 from N. Devon.

A good many of the recorded occurrences of these insects cannot be properly related to one or the other species and still less to the two forms of *mucronata*, but in some instances late dates of observation or capture may reasonably assign the moth to *plumbaria*. Recent records of *mucronata* (since 1945), do mostly refer to *plumbaria* and can account for the absence of Irish observations under the latter name. *O. plumbaria* has the greater tolerance of habitat and thus a commoner distribution throughout Britain and it can be allocated to several stations in Ireland, namely Co. Cork, Co. Dublin, Killarney and Tramore. *O. mucronata* is more a western and northern species, occupying the southwest peninsula of England and continuing properly through Wales, the Isle of Man and the northern English counties to Scotland, and it is found again in Ireland; the southern insects are recognised as *umbrifera*; the Irish, Welsh, northern English and Scottish insects as *scotica*, but the variation seen in a long series of *scotica* will often contain moths of *umbrifera* appearance. In addition to the well-known Scottish localities, *O. scotica* is recorded from the Isle of Man, Cheshire, Lancashire and Westmorland, and from Co. Cork, East Tyrone and Co. Donegal in Ireland, and from several counties in N. Wales; doubt has been cast on the precise identity of moths from some of these Welsh localities owing to the slender distinctions between *scotica* and *umbrifera* but that they conform to *mucronata* is not questioned. My long series bred from Capel Curig larvae can be made to answer to both! but on larval evidence they would agree more with *umbrifera*.

Throughout their ranges, and both species may occupy the same ground, moths of *mucronata* emerge earlier in the year than do those of *plumbaria* but the latter has a much longer period of emergence that may extend from June to August. So a moth caught in July or later will certainly be *plumbaria*, and one taken in May will surely be *mucronata*, but those taken in June may be of either species. Even then it is doubtful if the two species actually overlap emergence; in Devonshire I found *umbrifera* over by the first week of June with *plumbaria* emerging later that month. The Scottish *mucronata* fly in late May to mid-June and *plumbaria* appears there in July. Cockayne recorded (1941) that larvae of both species hibernated but that *umbrifera* became fully-fed at the end of March. It is now well established that larvae collected during the autumn produce *mucronata* and that larvae found in April and May prove to be *plumbaria*. Mr. Austin Richardson has found larvae of *umbrifera* until March in the Forest of Dean locality, first recorded by him in 1940 (*Entomologist*, 73: 111).

The moths of both *mucronata* and *plumbaria* are so variable that while some specimens can be correctly identified by the colour or pattern, a good many others cannot; it is the *plumbaria* varieties that may assume the characters that usually distinguish *mucronata* and not the other way round, and this accounts for the inaccurate records of *mucronata* from the south-east and east of England. So far as Britain is concerned, the dark forms of *mucronata* appear to occur only in the

Scottish populations, and this occurrence of dark moths and dark larvae in Scotland only does lend support to the case for recognising the Scotch race to be specifically distinct, but there remains otherwise a total lack of morphological and biological evidence. The fact also that food and times of appearance agree so closely with *mucronata* from Wales and the south of England argues against long isolation of the Scotch (and Irish) populations. That *plumbaria* and *mucronata* have independent origin and history is not in question.

Perhaps the most outstanding problem to be solved in Britain is the isolated occurrences late in the last century of *mucronata-umbrifera* in South Essex, especially as one of the few preserved specimens is Prout's type of *umbrifera*. There appear to be only six specimens extant, all of them in the National collections, data as follows:—

- | | |
|---------------------|---|
| At South Kensington | 1. type female, L. B. Prout, Epping Forest, near Loughton, 9.v.1896. |
| At Tring | 2. Two specimens, labelled Epping Forest, 12.v.1896; from Prout's collection. |
| | 2. Two specimens, labelled Loughton, May 1895. |
| | 1. One specimen, labelled Epping Forest, 4.v.1884. |

D. S. Fletcher has been good enough to examine the diary of L. B. Prout and he confirms entries there relating to the three specimens caught by Prout in 1896. I have been most anxious to trace reputed specimens of *mucronata* from other localities in south-eastern England, but in all instances where Mr. Fletcher has examined the genitalia of such specimens he has found them to be *plumbaria*. We have also checked on the Loughton, June, specimens in the Hawkshaw collection of the University Museum, Cambridge, and found these to be *plumbaria*. It remains a remarkable fact that, despite the popularity of Epping Forest as a collecting ground during the last century, only six specimens of *mucronata* survive to-day, and that no captures have been made since 1896; and further, the nearest localities for which other genuine *mucronata* are known are in Gloucestershire, Dorsetshire and Wales.

One recent remarkable record is the capture of one *O. mucronata* by Sir Robert Saundby in his mercury vapour light trap at Burghclere, near Newbury, Berks., on 31.v.53; Sir Robert tells me that the earliest date he has recorded *plumbaria* there is 30th June and that whereas *plumbaria* occurs sporadically in the trap, no other *mucronata* has ever appeared.

Foodplants. Both species feed on Gorse, and in many habitats this is the only food. *O. umbrifera* feeds, in addition, on Broom in the Forest of Dean, *scotica* on *Genista* in Scotland and *Genista* is recorded also for *plumbaria*. Larvae that eat Gorse feed on the tiny axillary buds and will also strip the spines, but they do not seem to like the flowers at any stage. Larvae of both species feed at night and retire by day to the densest part of their bush, and in Gorse they hide away

amongst the dead foliage. When collecting them at night I found them to be rather sluggish, but to slowly coil and then drop when their bush was touched or when held in the lamplight.

Parasitism. None of the very large number of larvae I collected in Devonshire was parasitized but quite half a similarly sized batch from N. Wales were attacked by two ichneumons, the commoner of which Mr. Perkins identified as *Aophus speciosus* Wasm.

Descriptions of larvae.

O. mucronata s.sp. *umbrifera* from Peter's Marland, N. Devon. Length 20 mm.; body thickset, slightly dorso-ventrally flattened, segments longer than broad, with the first five abdominals the longest. Skin much wrinkled transversely on the posterior of each segment with thick intersegmental folds and fleshy lateral flanges. Tiny black tubercles each carry a short, sturdy bristle.

There were two forms, a common pale one and a scarce boldly marked one (two examples in 60).

The pale form has the ground colour a milky-white tinged with cobalt, and inclined to weak ochreous or stone-colour at the skin folds. A dorsal line is composed of a broken series of narrow black streaks beginning faintly on the first abdominal ring and continuing on each of the following four, comprising one short streak that bridges the intersegmental fold, and another longer streak at the centre of the ring; on remaining segments the streaks are shorter but appear to be joined into one line as the segments are contorted. To each side of this central line there is a crinkled line that is better defined at the beginning of the segment and again towards the end, where it forms a conspicuous dark spot, so that on each segment a pair of spots stands astride the dorsal line at both breaks, with the posterior pair much the larger and darker; these crinkled lines curve towards the dorsal line at their centre and the space between them is dusted a weak grey-blue. Laterally there are two sinuous, ochreous speckled lines that run one above the spiracles and the other to embrace them, while below the spiracles there are further, weaker, streaks. Ventrally there is a central, fine, pinkish line that runs from the first abdominal ring to the first pair of claspers, and this is edged by a broad pale band and then a broader brown stripe that is marked still darker at the segmental divisions.

True legs pale brown; claspers greyish, finely freckled. Head of the same pale body colour but freckled darker in front, deeply notched, set with many short hairs in front. Anal plate large and strong, dusted with black and set with four strong bristles along the posterior margin and marked with a small blackish wedge towards its extremity. Spiracles large, rounded, deep black and set well towards the dorsal aspect.

In this pale form the salient features are the dorsal streaks and associated pairs of dots, indeed, in the palest of all these are the only features.

In the dark form the ground-colour is inclined to pinkish and the degree of dusting along the dorsum is increased but not to obliterate the streaks and paired spots which, too, are more heavily marked. The space between the lateral lines about the spiracles is darkened to comprise a single blackish band that runs continuously from the head to the anal claspers. Ventrally the bands are uniform and blackish.

O. mucronata s.sp. *umbrifera* from Capel Curig, N. Wales. These were more variable than the Devon larvae, but they were equally common and I collected about 80, of which some 30 were of the pale, weakly-marked form, four with the dorsal and lateral bands strongly marked and the rest of the deeper, pinky-fawn colour: these latter examples were more like *O. plumbaria* in having the pale blue-grey dorsal band more crisply defined but the dorsal streaks and associated spots were still larger and more boldly marked than in that species.

O. mucronata s.sp. *umbrifera* from the Forest of Dean (from Mr. Austin Richardson).

Three larvae received in October 1958 showed little variation and were indistinguishable from the commonest form from Devon and N. Wales.

O. mucronata s.sp. *scotica* from Aviemore (twelve larvae from females caught by Mr. A. J. Wightman).

The general colour darker, even the palest was much clouded with dusky pink, and there was every transition to a deep chocolate-brown larva with only a small pale dorsal patch on each of the abdominal segments but with the head and thorax and anal segment remaining pale in all forms. All forms were suffused an attractive rosy pink. All forms had the dorsal streaks and paired spots heavily expressed.

Summary of larval descriptions.

Cockayne discussed the larvae of these moths, A.E.S., Vol. 5, No. 38 (194) and said he found similar variations in the colour and intensity of markings to both *mucronata* (*scotica*) and *plumbaria*, but this I cannot agree. The series of preserved larvae of *scotica* at Tring answer to my above description.

The larva of *O. mucronata* is certainly very variable. The most common form in S.W. England and Wales is the ill-marked, milky-white form that may be tinged with pink or ochreous, but rarely so deeply putty colour as in *O. plumbaria*. I have not seen or heard of any deeply suffused or smoky forms of larvae from those regions. The Scottish larval forms of *O. mucronata* alone in Britain show the dark chocolate suffusion and these appear to be equally as common as the plain rosy-pink or plain ochreous larvae. I do not know if the pale ill-marked form occurs amongst Scottish larvae. In all the larval forms of *O. mucronata* from both Scotland and England, the posterior pair of dorsal spots are much larger and better defined than is usual in *O. plumbaria*. I have found the larvae of *O. plumbaria* to be much less variable being typically of a bright putty hue and with a clear grey central dorsal band in which both posterior and anterior spots are



Figs. 1-4 *Ortholitha mucronata* s.sp. *scotica* Cockayne from Aviemore, Inv.
 Figs. 5-7 *Ortholitha plumbaria* Schiff, from Warwickshire. Figs 8 and 9
Ortholitha plumbaria Schiff, from Flint, N. Wales.

weakly expressed. In the darkest forms of *O. plumbaria*, as in the Sutton Park, Birmingham, population, the suffusion is of a smoky olive-grey and not at all brown so that the dorsal pattern is still visible and not obliterated as it is in *scotica*.

Figures—Plate VIII, *O. mucronata* s.sp. *umbrifera* Prout, N. Devon, collected in October and figured 27.x.1957, and 30.xi.1957, figs. 6-10. *O. mucronata* s.sp. *umbrifera* Prout, N. Wales collected in October and figured 26.x.1958, figs. 1-5.

Figures—Plate IX, *O. mucronata* s.sp. *scotica* Cockayne, *ab. ovis*, ex Aviemore, Scotland, female: figured 1.ix.1960, figs., 1-4. *O. plumbaria* Schiff., Sutton Park, Warwicks., collected in May and figured 1953, figs., 5-7. *O. plumbaria* Schiff., N. Wales, Flints., collected in April, and figured 11.iv.1954, figs. 8 & 9.

As this paper is of particular interest I am asked to list the relevant references:—

- Allan, P. B. M., 1949. Larval Foodplants.
 Cockayne, E. A., 1939-40. *Proc. S. Lond. ent. nat. Hist. Soc.*, 59.
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 South, R., 1961. *Moths Brit. Isles*, 2: 133.

For references dealing more specifically with nomenclature of the species and forms, see Lempke's excellent account.

Arenostola morrisii Dale (*bondii* Knaggs) Bond's Wainscot.

Although first discovered at Charmouth, Dorset, in 1837 and soon after found at Sidmouth, Devon, and Lyme Regis, Dorset, and later recorded from Portland, Dorset, most British specimens of *A. morrisii* hail from Folkestone, Kent, where the moth is easily located and caught in the public gardens of Leas Cliffs. These two centres, in Kent and on the Dorset-Devon border complete the distribution in Britain. The west country moths show darker shading between the veins of the forewings. The moth was at first confused with *Petilampa minima* Haw. and its true identity had become the subject of some controversy by the end of the last century; the correct name for the original Charmouth specimens was not really settled until Tams and Edelsten examined them again in 1938 (*Entomologist*, 71: 160).

The moth is out from about the third week of June until the middle of July. The pupa is long and slender and has a prominent beak, and the pupa of *Procus furuncula* Schiff. is of exactly the same shape, unlike

other *Procus* pupae, but it is rather smaller than that of *A. morrisii*. At Folkestone *P. furuncula* pupates a little later than does *A. morrisii* and a well-chosen date towards the end of May will find most *A. morrisii* in the pupa while the earliest *P. furuncula* are still only newly spun up. Both species pupate in similar niches low-down in a withered shoot.

A. morrisii feeds only in *Festuca arundinacea* Schreb. in Britain and reports of the larva being found in other grasses may be attributed to *P. furuncula*.

The larva is figured by Barrett (1899 *Lep. Brit. Is.*, 5: Pl. 204, figs. 5, 5a) but although the figures were drawn by Buckler they were not included in his Ray Society volumes. There is in Buckler (*Larvae of Brit. Butterflies and Moths*, 4: 31) an account of the egg and newly hatched larva. Barrett also gives an account of the larva and its discovery in Britain.

Description of the last instar larva. Length 20 mm. Colour a dulled waxy-cream, weakly marked with soft pink transverse striations to each side of the dorsum, leaving a broad space of ground colour along the centre in place of a dorsal line. The skin fleshy, laterally, and wrinkled transversely. Tubercles exceedingly minute, black, each with a very short black bristle. Spiracles small, broadly oval, black. Head dark reddish- or vandyke-brown, longer than wide. Prothoracic plate dark-brown, bold, little wider than the head. Anal plate pale ochreous-brown, shading darker towards the extremity where it becomes black; in shape this plate is rounded anteriorly but is brought to a solid knob-like point at the posterior where it bears a row of wiry bristles. The plate is preceded on the adjoining segment by a narrow strip of chitin that unites the row of tubercles there. True legs dark-brown, prolegs creamy-white and weak.

The peculiar shape and ornamentation of the anal plate and its associated strip of chitin are the only sure ways of distinguishing in the field between this larva and that of *P. furuncula*.

Figures—Pl. X, figs. 1 and 2, last instar feeding in *Festuca arundinacea* Schreb., Folkestone, 11.v.58.

Arenostola extrema Hübner (*concolor* Guen.) Concolorous Wainscot.

Larvae of the genus *Tapinostola* Lederer (part *Arenostola* Hampson) are amongst the least-known of all British Lepidoptera because they are so hard to find. They also very closely resemble one another. So it is not surprising to find few references to these larvae in the literature, either in the standard handbooks or in the popular journals. The pioneering work of the late H. M. Edelsten in unravelling the life-histories of this and allied obscure species must stand high amongst the achievements of field workers everywhere; during his active life, Edelsten gained a unique knowledge of the fen and Broad's Lepidoptera and but for him our present understanding of these secretive larvae would be bare.

A. extrema was for so many years a rare insect that the few lines given to it by Barrett (1899, *Lep. Brit. Is.*, 5: 106) and South (1907, *Moths Brit. Is.*, 1: 301) pretty well summed up all that was known until Edelsten's work. The distribution remains even now much the same except that no modern Cambridgeshire records are known; but in its Northampton haunts it has remained fairly plentiful, and at Woodwalton Fen, Huntingdonshire, it has had years of plenty intermittently since 1937, when Bowes and others found it commonly, while the older Woodwalton records date back to before the time when moths were artificially introduced there. The only recent occasion when the moth has been taken other than in these two counties was in 1957 when R. E. Ellison caught one at Eastbourne, Sussex.

The following account of the life-history of *A. extrema* is given by Edelsten and G. Todd (1912, *Entomologist*, 45: 285). "The eggs are laid in batches within the sheathing-leaf of the flower-stem of *Calamagrostis epigeios* [sic] and the larva enters the stem and feeds downwards, and hibernates towards the base of the stem. In the spring when the grass begins to shoot again, it feeds low down among the basal shoots. It enters several plants before it is full-fed. When about to pupate it enters the earth and spins a strong cocoon". The habits of the first instar larva are given 1913 *Entomologist*, 46: 110. I found the eggs to hatch in about a fortnight and the tiny larvae to be exceedingly active. Edelsten's and Todd's account of pupation is doubtless based on the behaviour of specimens in captivity for the natural habit of these *Tapinostolas* is to spin up within the litter of withering leaves at the base of an attacked shoot.

This larva is as difficult to discover wild as that of *A. fluxa* Hübn. and my note on collecting that species (1957, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1955: 154) applies equally to this. No more than a couple of inches of the stem at ground level is eaten by the larva which when small gains access by boring directly into the stem, but during later instars the fattening larva forces its way down between the leaf-axil and then eats out the centre of the stem; it can squeeze into very slender stems, even to splitting them apart and it must be capable of exerting much pressure behind the swollen thoracic segments. *Calamagrostis* shoots do fade after the larva has left but they are still very inconspicuous amongst the dense tangle of fen herbage and give no help in locating larvae.

I am grateful to Dr. E. Duffey for pointing out to me that *Calamagrostis canescens* (Weber) Roth. is a true fen plant, whereas *C. epigeios* (L.) Roth. occupies the drier fen margins as well as damp woodlands, and the latter grass has in consequence a much wider distribution over Britain, as has the moth *A. fluxa*. At Woodwalton Fen both plants grow commonly, but *C. canescens* is much the more abundant, and there *A. extrema* is the commoner moth. But in the Northants stations, such as the famous Bedford Purlieus, only *C. epigeios* is present and there, too, *A. extrema* is plentiful. At Mildenhall, Suffolk, *C. epigeios* is dominant and there only *A. fluxa* occurs.

It would seem that there is a foodplant complex worthy of further study, and we can say with certainty at present only that both plants can be attacked by *A. extrema* and that *A. fluxa* appears to be confined to the coarser *C. epigejos*.

Description of the last instar larva. Edelsten's and Todd's description of the fully-fed larva is as follows—"May 16th, 1910: Rather stumpy, swollen in the middle and tapering towards head and tail, but rather more towards the head. Head yellow-brown, shining and rather indented, and partly withdrawn into prothoracic segment. Plate on prothoracic segment shining ochreous; plate on anal segment also of same colour, and extending to thirteenth segment. Colour of larva creamy-white with a slight pinkish tinge along the back. Spiracles black. True legs yellowish; prolegs white; hooks blackish. Tubercles with black bristles. Length 20 mm."

My description is a little different. The head is dark-sienna with black ocelli and mouth-parts. The prothoracic plate is weakly notched and finely divided by a faint pale line, it is large and able to cover completely the head, and it is wider than the head. Skin colour a dull yellow-ochre rather than cream, much suffused with dull-crimson along the dorsal folds and before the skin becomes distended at full-growth two broad pinkish bands are evident. Like *A. morrisii* and *A. fluxa* it is not strictly true to say of *A. extrema* that the anal plate extends forward to the thirteenth segment, for the strip of chitin there is clearly separated to form a narrow band; there is a tiny rounded chitinous patch to each side of it, as there is also on the side of the prothorax. Prolegs each have a similar little patch near the base. The bristles are golden-brown and not black. True legs brown. The tiny black spiracles are set well towards the front of each abdominal segment. The anal plate is of the same shape as that of *A. fluxa*, ending in a blunt point and nothing at all like the bulbous knob of *A. morrisii*. The larva of *A. extrema* is more slender than either *A. fluxa* or *A. morrisii*.

Apart from the foodplant preferences in known localities, the task of identifying *A. extrema* larvae is a little helped by the fact that it completes its growth a good fortnight before the earliest *A. fluxa*. In appearance both species can look very much alike.

Figures—Pl. X, figs. 3 and 4, last instar in stems of *Calamagrostis canescens* (Weber) Roth. Woodwalton, 14.v.60.

A general note on the larvae of Procus Oken and Tapinostola Lederer.

Larvae of these genera feed in a variety of grasses and sedges during spring and early summer; some are very common and occur in no special foodplant, others are rarely found and may be restricted to one species of plant and to a particular habitat. They all feed at the blanched lower parts of the plant stem and move from stem to stem. A withered or faded shoot may betray their presence but more often than not these larvae remain totally hidden and an attacked stem may show up only after the larva has left it. Pupation is passed within a soft cocoon of chewed stem fragments spun tightly together within the stem and at

its very base. When searching for fully-fed *Tapinostolas* or their pupae it is more rewarding to examine the stunted thicker shoots that appear quite dead and to ignore the taller healthy stems around them.

Most common of all these larvae, both in distribution and catholic choice of food, is *P. furuncula* Schiff. which is the larva most usually encountered when the less-common species are sought. It is equally common in marsh or heath grasses and becomes fully-fed from the middle of May to the end of June. It varies in colour from bright mustard-yellow to pale-cream and often shows a conspicuous dorsal vessel; it is distinguished by the absence of chitin from the penultimate segment.

Other common larvae are *P. strigilis* Clerck and *P. lutruncula* Schiff. which are often associated with Cock's-foot grass (*Dactylis glomerata* L.), but other kinds are eaten as well as *Carex*. They can be found in the last instar from March until late May. Another Cock's-foot feeder, but one which completes its growth in May-June, is *Apamea secalis* L., and this, too, is equally at home in *Carex*. Its emerald-green body and plum-red stripes easily distinguish it from all other internal-feeders except *Oria musculosa* Hübn. before full growth, but *A. secalis*, like most of these larvae, is also fond of cereal crops. The larva of *P. fasciuncula* Haw. is less often found although not restricted to any particular grass. It is full-grown from mid-May until June, and is bolder marked than *P. strigilis* Clerck and is much more slender and has a larger, flatter, head. The larva of *P. literosa* Haw. likes cereals, and I have found it in Lyme-grass (*Elymus arenarius* L.) and Marram Grass (*Ammophila arenaria* (L.) Link.), in addition to common wayside grasses, including the fine *Festuca ovina* agg. It, too, reaches full growth by mid-June.

Of the *Tapinostolas*, *Arenostola elymi* Treits. is the easiest to recognise, partly owing to its large size but mainly because of its distinctive food and maritime sandhill habitat. The larva of *A. pygmina* Haw. is very rarely found, despite the moth being the commonest and most widely spread of the genus; it appears to eat only *Carex* (my record 1956 *Entomologist*, **89**: 234, of finding this at Camber in Lyme-grass and Marram Grass was in error for *P. literosa*) but *Glyceria maxima* (Hartm.) Holmb. (*aquatica* Wahlberg non Presl.) and *Eriophorum* have been quoted and I strongly suspect *Juncus* and *Molinia*. The three larvae closest in appearance are *A. extrema* Hübn., *A. fluxa* Hübn., and *A. morrisii* Dale, of which the last-named only may be separated by locality or food for it is confined to *Festuca arundinacea* Schreb. along the south coast, whereas the other two feed in *Calamagrostis* and may share the same Midland county localities.

In appearance all these larvae fall into two groups. The true *Procus* are drab pinky-grey and are well marked by purplish-maroon bands; the anal plate is rounded and edged in front by a narrow chitinous strip on the preceding segment; the thoracic segments have large plates of chitin supporting the lateral tubercles. The *Tapinostola* larvae are creamy or dulled yellow, often delicately shaded with pink each side of the dorsum; the anal plate is more pointed but is again preceded by a

narrow band of chitin on the previous segment; the thoracic lateral chitinised plates are much weaker.

The larva of *P. furuncula* has the same creamy-yellow appearance as *Tapinostola* but it totally lacks the chitinous band of the penultimate segment. The larva of *P. literosa* has heavily chitinised plates at the sides of the thoracic segments and two such patches in front of the anal plate instead of a strip.

One other larva that may be confused with these is *Petilampa minima* Haw. which is a yellowish-brown and is of much the same shape and it, too, has the narrow chitinous strip before the anal plate. It has only ever been found in *Deschampsia* (*Aira*) *cespitosa* (L.) Beauv. and is full-grown by early May.

All the larvae discussed here share the distinctive shape of the head capsule which is small and pointed, in contrast to the large, rounded head of other internal feeding noctuids—*Nonagria*, *Hydraecia* and *Celaena*. *Oria* and *Sedina* also have this small pointed head, and as a group these larvae are alone amongst the Noctuidae in having a spindle-shaped body associated with that form of head. This structure, doubtless, has evolved along with the mode of entering host-plants, which in later instars is by pushing down via the leaf axils, and not by boring in directly.

It is unfortunate from this evidence of the early stages that the species formerly grouped into *Tapinostola* Lederer are to-day lumped with others which in no way match them and all are collectively called *Arenostola* Hampson. I have previously (1957, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1955: 154, and 1960, *ibid.* 1959: 214) made this point, and again take the opportunity to re-state it. A similar state exists among the species recognised to-day as forming the genus *Procus*, for the pupae of *P. furuncula* Schiff. and *P. literosa* Haw. are beaked and slender and weakly chitinised pale-brown and are quite unlike the hard, brittle and black, dumpy pupa of *P. strigilis* and allied species; another misplaced species is *Apamea secalis* L. whose larva and pupa correspond so closely with those of *Procus fasciuncula* Haw. as to leave no doubts as to its proper separation from *Apamea*.

Procus furuncula Schiff. The Cloaked Minor

A figure is given on Plate X, fig. 7, for comparison with *Tapinostola* form of larva.

Celaena ophiogramma Esper. The Double-lobed moth

The early stages are described in Buckler 4: 93, but no account is given of the fully-grown larva and there is no figure. A description and fair figure are given by Barrett (1897, *Lep. Brit. Is.*, 4: 401, pl. 184, fig. 3d). Wilson (1880, *Larvae Brit. Lep.*, p. 234) was evidently unacquainted with the species and his foodplants, Common Reed and Yellow Flag, have never been substantiated. It is a widely distributed species in Britain; there are few counties of England without a record and it is well spread over Wales, Scotland and Ireland. The larva



Figs. 1 and 2 *Arenostola morrisii* Dale, last instar. Figs. 3 and 4, *Arenostola extrema* Hübner, last instar. Figs. 5 and 6 *Celaena ophiogramma* Esper. Fig. 7 *Procus furuncula* Schiff.

feeds within the stems of *Phalaris* and *Glyceria maxima* (Hartm.) Holmb. (*aquatica* (L.) Wahlbg. non Presl.) and is full-fed by early June.

Description of last instar larva. Measures to 30 mm. long. Colour a pinky-brown, paler beneath and at the segment divisions. The only ornamentations are the strongly chitinated plates and tubercles. The prothoracic plate is large, semi-circular, dark-brown to black, shining, and divided by a fine whitish dorsal line; the anal plate is more rounded and is much less glossy, it is edged in front by a narrow dark strip of chitin which has a large tubercle to each side, and is itself preceded by heavy chitinating of the last four dorsal tubercles. The other dorsal tubercles are very small. Spiracles small and black. True legs dark-brown, prolegs greyish. Head small, dark-brown or black and very shining.

Until the last moult the larva might be confused with *Hydraecia micacea* Esp. and it is best distinguished by the simple prothoracic plate.

The larva of *U. ophiogramma* has little in common with either of the *monoglypha* or *sordens* forms of *Apamea* larvae (Haggett, 1957, *Ent. Gaz.*, 8: 223); the arrangement of tubercles and development of chitin associated with them especially on the later abdominal segments suggests that this species is better grouped with *leucostigma* and *haworthii* in *Celaena* as some systematists have long recommended. Whether it is still better to unite *Celaena* with *Hydraecia* is of less significance here.

Figures—Pl. X, figs. 5 and 6, in stems of *Glyceria maxima* (Hartm.) Holmb. (*aquatica* (L.) Wahlberg non Presl.), Lynford, Norfolk, 24.v.51.

Hydraecia hucherardi Mabille Marshmallow Moth.

This fine *Hydraecia*, which has also been called the Giant Ear, first came to notice in Britain at a meeting of the South London Entomological and Natural History Society on 25th June 1952 (1954, *Proc. S. Lond. ent. nat. Hist. Soc.*, 1952-3: 9 and 41, and Pl. III, fig. 1) where the specimen caught by Mr. Saunders at Hailsham, Sussex, in the previous year was exhibited. This was reported (1952, *Ent. Gaz.*, 3: 182) under the name of *osseola* Staud. (*hucherardi* Mab.). The date of capture originally given as 26th June 1951 was later found to be incorrect. The following year six moths were taken in Romney Marsh, where in the year after that Dr. Kettlewell and Mr. A. L. Goodson carried out their brilliant field work, when they caught a good many moths and discovered the foodplant with larval workings and an empty pupa (Kettlewell, 1954, *Entomologist*, 87: 249-257 and Goodson, 1955, *Ent. Gaz.*, 6: 65-68). The following year Kettlewell reared the species through from the egg, and wild larvae and pupae were found in abundance near Rye, Sussex (Kettlewell and Haggett, 1955, *Entomologist*, 88: 217-223). A full account of the life-history is given in the paper by Kettlewell and Haggett, with descriptions and figures of the larva and pupa, and a

further contribution with description of the egg by Haggett and Wightman (1956, *Entomologist*, **89**: 67).

It was at first thought that the moth might occur wherever its food-plant grew in suitable conditions over southern England, but its distribution has remained confined to the coastal marshes of East Sussex into Kent and there it continues to be locally plentiful. As has been the case with other newly-discovered British moths, there are opposed views on the origin of *H. hucherardi* in Britain; Dr. de Worms has summarised the opinions of those who think the moth to be a newly-established species of migratory origin (1957, *Entomologist*, **90**: 241) and Wightman (1959, *Entomologist*, **92**: 77) states the case for believing *H. hucherardi* to be a long-established resident. Robin Mere also thinks it is a recent addition, probably emanating from the coast of Brittany (1961, *Proc. S. Lond. ent. nat. Hist. Soc.*, **1960**: 67).

The life-cycle may be summarised as follows: The eggs hatch about early May and the young larva bores into the growing shoot of Marsh-mallow, *Althaea officinalis* L. eventually working downwards into the rootstock where it spends the later instars. Pupation begins from the end of July and the moths emerge from the middle of August until October. Both in its habits and in the structure of egg, larva and pupa, *H. hucherardi* agrees closely with *H. micacea* Esp., *H. petasitis* Doubl. and *H. flavago* Schiff. as well as with *Rhizedra lutosa* Hübn.; their eggs and pupae are quite different from those of *H. paludis* and its sibling species but I am now less inclined to split the genus on this evidence alone.

Description of the last instar larva. The following is based on my original description: The larva described measured 37 mm. long. In shape cylindrical, rather flattened along the dorsum, with taper at the anal end only from the last three rings, virtually no taper at the thorax, which is rather wider than the head and which ends squarely behind it. In lateral aspect the last three abdominal segments decline steeply to the claspers so that the anal plate is held obliquely.

Colour a drab pinky putty hue, the gut and dorsal vessel showing through the palely pigmented skin as purplish. The body colour is uniform both dorsally and beneath as well as along the sides. Along the back of the abdominal segments and occupying the region of the trapezoidal warts there is a series of darker pink patches which merge with the ground colour towards the mid-dorsum, but which are squarely terminated below so that the pale ground colour lateral to it appears as a broad pale subdorsal band. Again, in the region of the spiracles the abdominal segments are shaded a darker pink, so that the fleshy lateral flange below appears pale in contrast. These two series of darker pink blotches give the newly moulted last instar larva a distinctly banded appearance, but this is less marked when the larva becomes fully grown and assumes a more uniform pallid complexion with only the faintest traces of pink shading.

Thoracic plate pale-ochreous, shining, depressed dorsally and usually edged in front by a narrow smoky border. It is slightly pointed where

it meets the epicranial suture of the head, and rather restricted laterally, terminating squarely well above the prothoracic spiracles.

Anal plate pale-ochreous, shining and set with sparse fine short hairs. Spiracles deep-black, oval and very conspicuous, those on the eighth abdominal segment only slightly larger. All warts tiny, pale-brown, and weakly chitinated, bearing a short fine hair. True legs pale-brown tipped with darker; prolegs putty colour with no well developed plate.

The most striking feature of this larva is the large globular, shining, bright ginger-coloured head which has heavy black mandibles and a pale labrum.

Figures—Pl. XI, figs. 1, 2 and 3, all last instar, figured soon after the last moult. In roots of *Althaea*, Rye, Sussex, 25.vii.55.

Calamia tridens Hufnagel (*Luceria virens* L.) Burren Green.

Many of the species absent from Buckler's volumes were known to collectors of the last century only as rarities or chance vagrants; others have only in recent years become known as independent species. This moth, which has also been given the unfortunate name of the "Claddagh", belongs to a very different group again, species which have long been breeding here but which had been completely overlooked. It inhabits only the Burren limestone district of Co. Clare, western Ireland, where the moth was first found by Capt. Wright in 1949 and where in the following year it was found to be a locally common resident. Since then the species has been caught in plenty by collectors able to make the long trip especially for it.

In 1954 (*Ent. Gaz.*, 5: 155) Dr. Cockayne described this Irish form of *C. tridens* as the subspecies *C. occidentalis* which is thought to have closer affinities with the *tridens* of the Iberian peninsula than with those of less-distant stations in north-west Europe.

The moth flies during August, particularly the early part of the month, and may be found newly-emerged amongst the limestone rocks at night or caught at light. The eggs hatch late in the following spring, and the larva feeds up through seven instars in two months (in captivity) It can be reared through on *Poa annua* L. but it will eat also *Dactylis glomerata* L.; in the wild it is believed to eat *Sesleria caerulea* Scop. For accounts of rearing this species see 1951, *Ent. Rec.*, 63: 271-273 and 64: 72-73, also 1953, *Ent. Gaz.*, 4: 314. The early history and discovery of the moth are discussed at length 1951, *Ent. Gaz.*, 2: 87.

Description of the last instar larva. The following is based on my original note (1953, *Ent. Gaz.*, 4: 317) based on larvae reared from the egg, and rather smaller at full-growth than may be expected in wild specimens.

When fully-grown it measured 32 mm. long, the segments being rather more solid and less telescoped than in earlier stages. The heavy, massive head dark black-brown with fine pale suture and barely divided

above, rather flat in front with large solid mouth-parts; sparse fine soft hairs in front; much polished and shining. A broadly semi-circular prothoracic plate encased the entire back of its segment, black with transverse depression. Anal plate large, blackish and shining, also set with sparse fine long hairs. Warts rather small, rounded and flattened, each with a fine hair, shorter along the back than on the sides. Prolegs weak, greenish-grey edged below with black. Anal claspers black and shining. True legs strong, large and pale reddish-brown. Dorsal maroon banding streaked into grey-ochreous, rather broken and blotched. Between segments and also beneath it appeared soft olive-green in some, light putty-coloured in others, and as the segments contracted the skin folded white or soft blue green. Thorax greyish ochreous and much wrinkled, the single series of warts on meso- and metathorax placed on an ill-defined dark-brown transverse band. Spiracles black and oval. Dorsal vessel very conspicuous all along the abdominal rings. In shape a cylindrical larva rather broader and flattened along the dorsum of the thoracic and early abdominal segments, the remaining segments becoming rounded and gradually smaller to the steeply ascending anal plate.

A fleshy rather nondescript larva, most exasperating to describe and figure owing to its persistent motion and dislike of even moderate light; it became hopelessly active under artificial illumination.

The likeness of the full-grown *virens* larva to *monoglypha* . . . is extraordinarily close. Arrangement of warts is very similar, also the shape of the plates and head. All warts are, however, much smaller in *virens*, flatter, and being less heavily chitinized, are dull and less glossy. The dorsal transverse bands of chitin of the second and third thoracic segments are in *virens* weakly expressed and at the sides of these segments tubercles iii and iv are quite separate whereas *monoglypha* has them linked. *Virens* is considerably smaller and shorter yet the size of its head is quite equal to that of *monoglypha*'.

The larva approaches the *Xylophasia* (*monoglypha*) form of *Apamea* more closely than any other, while it is not too dissimilar from *Luperina* and its habits are also alike: its peculiar pupal cremaster makes it unique amongst British Lepidoptera. It has nothing immediately in common with *Nonagria* or *Tapinostola*.

Figures—Pl. XI, fig. 4, first instar, 7.iv.53; fig. 5, third instar, 26.iv.53; fig. 6, sixth instar, 4.v.53; figs. 7-9, seventh instar, 17-v.53. All *ab. ovis* on *Poa annua* L. ex females, Co. Clare, from E. W. Classey.



Figs 1, 2 and 3 *Hydraecia hucherardi* Mabille, last instar. Figs. 4-9 *Calamia tridens* Hufn.: fig 4 first instar; fig. 5 third instar; fig 6 sixth instar; figs 7, 8 and 9 seventh (last) instar.

REPORT ON THE INSECTS COLLECTED BY THE E. W. CLASSEY AND A. E. GARDNER EXPEDITION TO MADEIRA IN DECEMBER 1957

By A. E. GARDNER, F.R.E.S., and E. W. CLASSEY, F.R.E.S.

PART II. COLEOPTERA

In Part I (Gardner and Classey, 1960) we gave a brief survey of the climatic and physical features of Madeira and reported on the Orthopteroid insects, Isoptera, Lepidoptera, Hymenoptera and Diptera collected during our stay from the 8th to 22nd December, 1957.

Before listing the species taken we think it fit to discuss briefly the coleopterous fauna which in the Madeiran Group presents many interesting features. Only a limited time could be spent searching for beetles; this, in addition to the secretive habits exhibited by the vast majority of species resulted in our only reporting on 54 species. Despite this, we have recorded 11 species apparently new to Madeira proper including one species new to science.

As Wollaston's *Coleoptera Atlantidum* (1865) is still an authoritative work we have largely followed his sequence at family level in order to facilitate reference to our captures, even to retaining his families in some cases where these are now reduced to tribe status.

All students interested in the Coleoptera of the Madeiras, Salvages and Canary Islands owe a debt of gratitude to T. V. Wollaston. Of latter years many authors have corrected some of his early errors and added to the list of species, but it was Wollaston who collated the work of early entomologists and added a vast amount of original research which produced the basis of our knowledge of the Coleoptera of the Madeiras.

The total number of species known probably stands at nearly 800. Jansson (1940) lists 737, a considerable increase from the 664 known to Wollaston in 1865.

In the main the fauna is Mediterranean with a small North African element. As the islands have been inhabited since the 15th century it is not surprising that a high percentage of species have been, and continue to be, introduced in plants and merchandise. This is a disturbing fact which calls for the greatest care in describing new species. We are grateful to Mr. J. Balfour-Browne for pointing out that our new nitidulid *Brachypeplus maui* n.sp., was conspecific with a hitherto undescribed specimen taken in S. E. Queensland, Australia. A similar introduction can be cited by Cameron (1901) finding the Staphylinid *Oxytelus advena* Sharp in Madeira which had been described from Oahu, Hawaiian Islands in 1880.

One of the interesting features is the high proportion of endemic species which occur in Madeira. Of the 737 species recorded by Jansson

(1940) 283 appear to be endemic. Although the islands are unlike geologically, the fauna of the Desertas has a greater affinity with the island of Porto Santo than with the central mass of Madeira.

The Rhynchophora are the dominant forms, nearly 120 species being recorded. The Necrophaga, Brachelytra, Geodephaga and Heteromera are also strongly represented in the order given. The Phytophaga, Longicornia and Hydradephaga are but poorly represented whilst the Sternoxia are almost non-existent.

A remarkable fact is that over 200 of the Madeiran species are so far deficient in wings that they cannot fly and of 29 endemic genera, no less than 23 are in this condition. Darwin (1859) considered that the more active individuals had been blown out to sea and lost whilst the less active species had remained. Cockerell (1923) finds it difficult to suppose that Coleoptera on the main island of Madeira are in any particular danger as the strong winds blow inland. He proposes the theory that the ancestors of many of the endemic species reached the island on floating trees and other objects. The less active and apterous forms would eventually reach safety whilst the more active members would leave their support and consequently perish in the sea. To this he also suggests that mutations are more often in the direction of loss or reduction of parts than the reverse.

Despite the work already carried out, it will be obvious that there are many problems to be solved and many new species await discovery especially in the comparatively unworked north and west of Madeira. Now that a run-way has been constructed, to accommodate jet aircraft, on the little island of Porto Santo, it is imperative that the fauna is studied in detail before many interesting forms are lost for ever. We are taking active steps to do this and hope to publish our results in this medium at a later date.

ACKNOWLEDGMENTS

In addition to the acknowledgments made in our previous paper we give grateful thanks to the Trustees of the British Museum (Nat. Hist.) for permission to study the Wollaston Collection. To the following specialists our best thanks are due for assistance in identifying material:—Dr. B. P. Moore, Dr. E. B. Britton, Messrs. J. Balfour-Browne, F. D. Buck, E. Gowing-Scopes, H. R. Last, and L. S. Whicher. We also wish to thank Mr. G. E. Maul and his staff at the Museu Municipal do Funchal for valuable assistance; Mr. F. D. Buck for much help on many points and Mr. W. H. T. Tams who accompanied us and gave valuable assistance and companionship.

LIST OF SPECIES COLLECTED

CARABIDAE

Scarites abbreviatus Dej.

A large number of these handsome carabids were taken from Camacha (684 m.), Palheiro Ferreiro (616 m.), Ribeira das Cales

(1,282 m.) and Santana (436 m.). Found under large stones and rocks it occurs most commonly in Madeira and the Deserta Grande at intermediate and lofty altitudes. In Porto Santo and the Ilheo de Fora it descends to sea-level. Very variable in size, the large form found in Porto Santo was considered by Wollaston (1854) to be a distinct species which he named *humeralis*. The species is endemic to the Madeiran Group.

Cymindus (Tarus) maderae (Wollas.)

A few specimens taken at Choupana and moderately common at Ribeira das Cales (1,282 m.) under stones at the edge of streams. Formerly confused with *C. lineatus* Schön, Wollaston (1854) records it as common from autumn to early spring occurring under stones in open grassy spots towards the highest peaks. An endemic species.

Zargus schaumii Wollas.

A few specimens found under stones at Choupana and Camacha (684 m.); very common on the slopes of Palheiro Ferreiro (616 m.). Like the preceding species it is confined to Madeira proper and occurs from autumn to spring. Generally found at the intermediate altitudes and seldom above 3,500 ft.

Laemostenus complanatus Dej.

One specimen found under stones at Choupana and four under stones in the garden of our hotel in Funchal. Not uncommon along the southern coast at low elevations and in towns, also found in Porto Santo.

Calathus obesus Colas

Fairly common under stones at Choupana, Camacha (684 m.), Santana (436 m.) and very common at Palheiro Ferreiro (616 m.) It would appear to be generally distributed at the intermediate and high altitudes. An endemic species.

Calathus vividus (F.)

Moderately common under stones at Palheiro Ferreiro (616 m.) and Ribeira das Cales (1,282 m.). Like the preceding species, endemic and not uncommon in the sylvan regions at intermediate, and the more barren areas at lofty elevations.

Odontonyx (Odisthopus) maderensis (Wollas.)

Found sparingly at Camacha (684 m.) and Palheiro Ferreiro (616 m.) under stones in grassy regions. An endemic species found in Madeira and the Desertas at intermediate, and more commonly at the high elevations.

Agonom (Anchomenus) ruficorne (Goeze)

Several specimens found at Ribeira das Cales (1,282 m.) under stones in the vicinity of streams. This common European species is recorded also from the Azores and Canary Islands.

Pterostichus (Argutor) gracilipes (Wollas.)

A few specimens found under stones at Choupana and Palheiro Ferreiro (616 m.). An endemic species which Wollaston (1854) records as generally distributed at intermediate altitudes. On the northern side of the island he records it during the winter months at sea-level at the Passo d'Areia near São Vincente.

Pterostichus bedelianus Luts.

Although not recorded by Wollaston we found this species common under stones and logs at Santana (436 m.), Camacha (684 m.), Palheiro Ferreiro (616 m.), Ribeira das Cales (1,282 m.) and Chao das Feiteiras (1,278 m.). An endemic species which seems confined to the low and intermediate altitudes.

Nesarpalus gregarius Fauv. (*Harpalus vividus* Dej.)

Several specimens found under stones at Choupana. An endemic species which Wollaston (1865) records as common on all the Madeiran islands from sea-level to the peaks.

Amara aenea (Deg.) (*trivialis* (Gyll.))

Several specimens found under stones at Choupana. This common European species is recorded by Wollaston (1865) as common in Madeira and Porto Santo. It appears to occur at the low and intermediate altitudes.

Harpalus distinguendus (Dufts.)

Several specimens under stones at Chao das Feiteiras (1,278 m.). This common European species is common throughout Madeira at nearly all elevations. In Porto Santo it is even more abundant where Wollaston (1854) observed it in profusion in the low sandy vineyards behind the sea-beach.

Harpalus attenuatus Steph.

Several specimens found under stones at Choupana and Ribeira das Cales (1,282 m.). This common European species occurs at most elevations in Madeira, Porto Santo and the Deserta Grande.

Bembidion obtusum Serv.

One specimen found under a stone at Monte (743 m.). This common European *Bembidion* occurs at most elevations and according to Wollaston (1865) on all the Madeiran islands except the northern Deserta. It assumes a rather large form ab. *tethys* Netolitzky found likewise in southern Europe.

Microlestes (Blechrus) glabratus (Duft.)

A number of specimens found under stones on the grassy slopes at Ribeira das Cales (1,282 m.). This European species is not uncommon at intermediate altitudes on Madeira proper.

DYTISCIDAE

Colymbetes lanio (F.)

Two specimens of this large and handsome *Colymbetes* were taken in a shallow backwater of the Ribeiro do Porto Novo, south of Camacha (684 m.). Wollaston (1854) records it as universally distributed beyond the elevation of 1,000 feet, most abundant between the limits of 3,000 to 4,000. Its greatly developed wings enable it to take refuge in isolated pools which it could not reach except by flight. Apparently only found on the island of Madeira.

Agabus nebulosus (Forst.)

Two specimens were taken in a concrete water tank at Palheiro Ferreiro (616 m.). This common European species is locally abundant in Madeira and has also been taken in the two northern Desertas.

Agabus maderensis Wollas.

Three specimens, one male and two females were found in a shallow and wide stretch of the Ribeiro do Porto Novo south of Camacha (684 m.). An endemic species common in all the mountain torrents. Wollaston (1854) found it on the southern side of the island above 1,000 feet and in the north from sea level to the greatest height at which water existed.

PARNIDAE

Dryops luridus Erickson (*Parnus prolifericornis* F.)

Three specimens found under stones in a small stream above Monte (743 m.) and one at Choupana. This widely distributed European species is common in Madeira and is also recorded from the Canary Islands and Azores.

HELOPHORIDAE

Calobius heerii Wollas.

This remarkable little beetle was first discovered by Professor Heer in February 1851 adhering to marine *Confervae* in the salt-water rock pools at Gorgulho near Funchal and appears to have evaded Wollaston (1854) during his extended collecting trips to Madeira. Nearly one hundred years after its first capture we found it abundant in the rock pools at its type locality. The pools in which the species lives consist of unadulterated sea-water left by the tide. We are indebted to Dr. B. P. Moore who tested the water and found that the salinity was 3.3 per cent. and pH 8.3. Wollaston (1857) found the species on Porto Santo where they tended to be larger and more brassy in colour.

NITIDULIDAE

***Brachypeplus mauli* n.sp. (Plate xii).**

Elongate, depressed; reddish-brown with head and apical third of elytra black; legs and antennae reddish-brown, club darker.

Head with vertex black, dull, heavily punctured and lightly clothed with pale pubescence; clypeus and mandibles fuscous; antennae short, reddish-brown, club compact, darker in colour and with apical segment pale.

Pronotum reddish-brown, transverse, nearly twice as wide as long, finely margined, anterior and basal margins straight, sides with anterior angle rounded, basal angle obtuse, widest at middle; puncturation regular, close and of shallow depth; pubescence light in colour, depressed.

Scutellum triangular, finely punctured and pubescent.

Elytra reddish-brown with apical third black, lightly clothed with pale pubescence, quadrate leaving last three visible tergites exposed; side margins nearly parallel, explanate apical margin truncate; striate puncturate, punctures separated by less than their width; interstices raised and seriate punctate.

Abdomen with last three visible tergites reddish-brown, lightly clothed with pale pubescence; lightly punctured, moderately convex with side margins flattened; last visible segment nearly twice as long as preceding, apically narrowed and obtuse.

Legs reddish-brown, short; tibiae flattened and strongly widened apically.

Length: 3.9 mm.

Holotype: Terreiro da Luta, Madeira, 878 metres, (E. W. Classey and A. E. Gardner Exp.) 8-22.xii.1957. Found on window of hotel.

Paratype: Tambourine Mountains, S. E. Queensland, Australia, 26-29.iv.1935, R. E. Turner. In British Museum (Nat. Hist.) Collection. Type presented to British Museum Coll.

This species is nearest to the Australian species *B. uattsensis* Blackb., but differs from this latter species by the following characters. The elytra are less elongate and interstices less narrow and costate; scutellum less heavily punctured; pronotum not fuscous, less quadrate in outline and not crenate at sides. The pronotum of *B. uattsensis* is also more heavily punctured and with larger punctures at base. This latter species also has the pronotum with the anterior margin excavate and strongly explanate at basal angles.

The fact that an Australian species occurs in Madeira can probably be explained by introduction. The seeds of Australian Acacias and Eucalypti are imported and the plants grown in large numbers. It was in such an area that the beetle was discovered. We have pleasure in naming the species after Mr. G. Maul of the Museu Municipal do Funchal.

DERMESTIDAE

Dermestes cadaverina F.

A single specimen found on a wall in Funchal. Not recorded by Jansson (1940) and probably introduced in merchandise.

APHODIIDAE

Aphodius lividus (Ol.)

A single specimen caught in flight at Pico da Ponta Cruz. This common European species is widely distributed but not common in Madeira and Porto Santo. It occurs at low and intermediate altitudes.



Brachypeplus mauli n.sp.
(The scale line indicates 1 mm.)

Aphodius granarius (L.)

Very common in sheep dung at Chao das Feiteiras (1,278 m.). Another common European species found throughout Madeira and Porto Santo from sea-level to within a short distance of the extreme summits of the peaks.

CIIIDAE

Octotemnus opacus Mellié

Very common in large fungi at Monte (743 m.). This species often occurs in profusion with *Vis lauri* Wollas., under the bark and in the rotting wood of old laurels and in gigantic fungi in the dense ravines at intermediate altitudes. It also occurs sparingly in the Canary Islands.

CURCULIONIDAE

Phytonomus fasciculatus Herbst. (*Hypera lunata* Wollas.)

A single example taken under a stone at Santana in the north of the island. It occurs in dry situations in all the Madeiran islands except the northern and southern Desertas.

Laparocerus clavatus (Wollas.)

Several specimens found under stones at Monte (743 m.). A rare endemic species found beneath stones and in the fissures of rocks at lofty elevations.

Laparocerus morio Schön.

A number of specimens found under stones at Camacha and Choupana. The common *Laparocerus* of the Madeiran islands found from sea-level to the summits of the peaks, also recorded from the Canaries.

Sitona lineatus (L.)

A single example swept from grass above Monte (743 m.). This common European species is found throughout the Madeiran Group where it is most frequently found on cultivated ground and in corn-fields.

Barypithes indigena Boh.

On the first day after our arrival we were collecting above Monte at about 900 m., when we were forced to stop owing to heavy and persistent rain. The previously docile levadas quickly became raging torrents carrying with them masses of litter and pine needles. We collected as much of this material as possible in our nets which was brought back to our hotel for subsequent examination. The only Coleoptera present were a large number of this hitherto unrecorded weevil. No doubt it has been overlooked by previous workers on account of its secretive habits and previously was only known from Portugal, western Spain and one record from France.

CRYPTOCEPHALIDAE

Cryptocephalus crenatus Wollas.

A single specimen of this endemic species swept from herbage at Monte (743 m.). It occurs sparingly at intermediate altitudes in grassy places and amongst dense herbage.

CHRYSOMELIDAE

Chrysolina banksi (F.)

A number of specimens taken crawling up the stone walls at Ribeira das Cales (1,282 m.) and under similar circumstances at Choupana. Not recorded from Madeira by Wollaston (1865) but taken by Prof. Dr. O. Lundblad in 1935 at Rabaçal (1,080 m.) with *C. hyperici* (Forst.) Jansson (1940).

COCCINELLIDAE

Coccinella mutabilis Scriba.

A single specimen swept off flowers at Santana. This common European species occurs in Madeira and Porto Santo at most elevations.

Coccinella septempunctata L.

A number of specimens swept and found on flowers at Funchal, Santana and Pico da Ponta Cruz. This almost cosmopolitan species is recorded from all the Madeiran islands except the northern and southern Desertas. Known locally as "Joaninha" and in the Canaries as "San Antonio".

TENTYRIIDAE

Hegeter tristis (F.) (*elongatus* Wollas.)

A few specimens found under large stones at Ribeira das Cales (1,282 m.) and on stacked timber at night at Pico da Ponta Cruz. Common throughout the Madeiran Group where it usually occurs at low elevations beneath stones or in basaltic caves. Occasionally met with in dwelling houses and Wollaston (1854) records it from Porto Santo in profusion in a large cavern near the summit of the Pico d'Anna Ferreira.

BLAPIDAE

Blaps gages (L.)

A single specimen found in the centre of Funchal. This large European *Blaps* is found sparingly in Madeira and Porto Santo chiefly in basaltic caverns.

CONIONTIDAE

Ellipsodes glabratus (F.)

A few specimens found under stones at Monte (743 m.) very common under stones at Ribeira das Cales (1,282 m.). This endemic species occurs at the intermediate and high elevations. It shuns the light and in the more sylvan areas is found at the roots of trees and at higher elevations beneath stones in grassy areas.

OPATRIDAE

Opatrum hispidum Brullé

One specimen taken under a stone at Camacha and common at the roots of grass in Funchal. Abundant throughout the Atlantic islands.

Hadrus alpinus Wollas.

Found fairly commonly at Ribeira das Cales (1,282 m.), Monte (743 m.), Choupana, and Palheiro Ferreiro (616 m.). This endemic species occurs under stones and logs in the sylvan regions at intermediate altitudes and above.

Hadrus carbonaris Quensel (*cinerascens* Dej.)

Two specimens taken under stones at sea-level at Gorgulho. An endemic species found from sea-level to the summits of the peaks. Most abundant at the lower altitudes it is found on all the islands of the Madeiran Group except Porto Santo where it is replaced by *H. illotus* Wollas.

HELOPIDAE

Helops confertus Wollas. (*asper* Wollas.)

Singletons taken under stones at Pico da Ponta Cruz and Camacha. An endemic species found under stones and bark at all altitudes although most common below 2,000 ft.

Helops vulcanus Wollas.

A number of specimens taken at night crawling over stacked timber at Pico da Ponta Cruz. An endemic species found beneath stones and in the fissures of rocks at low and intermediate altitudes. A coastal species found not only in Madeira but in all the smaller islands of the Group where in the Desertas it attains a greater size.

Helops lucifugus Wollas.

A single specimen of this endemic species was taken under a stone at Ribeira das Cales. Wollaston (1865) records it only from the island of Porto Santo.

ANTHICIDAE

Anthicus hispidus Rossi

A single specimen found under a stone at Chao das Feiteiras (1,278 m.). A common species found under stones and refuse generally at low altitudes in dry and sunny spots.

STAPHYLINIDAE

Tachyporous nitidulus (F.) (*brunneus* Grav.)

A single specimen found under a stone at Monte (743 m.). Found on all the Madeiran islands except the northern Desertas.

Quedius pallipes Lucas (*hammianus* Sharp).

One specimen found at Choupana under a stone. Apparently not recorded from Madeira.

Quedius pallipes ab. *secundus* Last.

Four specimens found under stones at Choupana.

Quedius laevicollis (Brullé) (*tristis* (Grav. nec. F.)).

A number of specimens found under stones at Monte (743 m.), Chao das Feiteiras (1,278 m.) and Choupana. Not recorded by Jansson (1940) and apparently a new record for Madeira.

Ocypus pedemontanus Müller.

Two specimens found under stones at Monte (743 m.). Apparently a new record for Madeira.

Pseudocypus obsкуроaeneus Fairm.

Several specimens found under stones at Ribeira das Cales (1,282 m.), Santana and Chao das Feiteiras (1,278 m.). Apparently not recorded from Madeira before.

Staphylinus winkleri (Bernh.)

Four specimens found stones at Choupana. Not recorded from Madeira.

Oxytelus complanatus Erich.

Three specimens found under stones at Monte (743 m.). Wollaston (1865) records this species as abundant in Madeira and Porto Santo.

Atheta schatzmayri Benick *in litt.*

Five specimens found in fungi at Monte (743 m.). Not recorded before from Madeira. Although considered to be a new species Dr. G. Benick is still comparing its relationship with *A. putrescens* (Wollas.) (*dilutipennis* Mots.) from the Canary Islands.

Atheta amicula (Steph.) (*sericea* (Muls. & Rey.))

A single specimen found in a fungus at Monte (743 m.). Apparently not recorded from Madeira.

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EDITORIAL NOTES ON NOMENCLATURE

Following the notes under this heading in our latest previous volume further points concerning the nomenclature adopted in our *Proceedings and Transactions* are given below.

There are still a number of troublesome matters in the Lepidoptera particularly amongst the micros, which are receiving attention. As these names occur for publication they must be resolved in one way or another if they are still outstanding and then our proposed treatment will be published under this heading.

F. D. BUCK.

GENERIC SYNONYMY

We have for some years been citing generic synonymy in a manner that is at variance with Recommendation 44A of the International Commission on Zoological Nomenclature (1961, *International Code of Zoological Nomenclature*, London, p. 44 and 45) which says: "In order to avoid misunderstanding, a synonym, or any term other than subgenus, should never be cited between the generic and specific elements of a binomen".

Our practice has been to show the generic synonym between the two elements of a name in parentheses. To comply with the recommendation would mean citing the complete name twice if we wish to show a generic synonym, first giving the name with the senior generic synonym and giving the name again in parentheses using the junior generic synonym, thus: *Nacerdes melanura* (L.) (*Anoncodes melanura* (L.)). In view of the amount of synonymy we show in this publication to ensure clarity, it is felt that this is cumbersome; and further, since lists form no small part of our volume this can cause just as much confusion in another direction.

By retaining the style used hitherto, *Nacerdes* (*Anoncodes*) *melanura* (L.), we are using a style which should be used to indicate a subgenus, this means we are showing *Anoncodes* to be a subgenus of *Nacerdes* instead of a synonym. Therefore, to differentiate between a synonym and a subgenus we will show the latter thus: *Atheta* (s.gen. *Dilacra*) *luteipes* (Er.).

This style is retained and the modification adopted with some reluctance because whatever opinions are held regarding the Code and the recommendations, it is undesirable to work contrary to them. Whilst it is felt that this deviation is of a minor character, it is not excused on this point, but rather on the grounds of economy and clarity within our own pages. *It should not be used for other publications.*

NOCTUIDAE (Lep.)

No. 554 in Heslop's Check List is incorrectly spelt and should be *Aporophyla luneburgensis* Freyer (1852-8, *Neuer Beitrage zur Schmetterlinges Kunde mit abbildungen nach der Natur*, Ausberg, Plate 526, fig. 2).

According to Mr. W. H. T. Tams (*in litt.*) our *Leucochlaena* species should be *oditis* Hübn. with *hispidula* Gey as a junior synonym, not reversed as in the list by Heslop, I. R. P. (1960, *Ent. Gaz.*, **11**: 63).

GEOMETRIDAE (Lep.)

The synonymy of No. 929 in the Heslop Check List is reversed; this species is correctly *Phigalia pilosaria* Schiff. (1775) (*pedaria* F. (1787)).

PYRALOIDEA AND TORTRICOIDEA (Lep.)

In his introduction to these superfamilies, Heslop, I. R. P. (1960, *Ent. Gaz.*, **11**: 225), dissatisfied with the changes in the inflection of trivial names when changed from genus to genus, has inflected them all to agree with the type genus in each sub-family.

There are many who disagree with the rule which requires grammatical agreement between trivial and generic names, and there is a very strong case for this disagreement; but the present writer cannot agree that Heslop has provided a satisfactory answer. He has but used the same rule in a different and more confusing manner. In subfamilies where the type genus does not occur in this country it is most probable that the average worker will be unaware of it. If one feels the rule is unacceptable, then surely the obvious alternative is to retain the original spelling of the trivial name regardless of which genus eventually contains it. However, it is considered that whether one agrees with them or not, to disregard all or part of the International Rules by individual workers according to their own ideas, can only result in greater confusion and eventual chaos. In consequence, names published in the *Proceedings and Transactions* will, where necessary, show agreement between trivial and generic names.

There are points of difference between Bradley, J. D. (1956, *Ent. Gaz.*, **7**: 151-156 and 1959, *Ent. Gaz.*, **10**: 60-80) and Heslop, I. R. P. (1960, *Ent. Gaz.*, **11**: 225-234 and 1961, *Ent. Gaz.*, **12**: 97-108). We shall be following Heslop, which being the most recent list, incorporates later research, and moreover forms part of a complete list of British Lepidoptera; except for the following points on which we are accepting Mr. Bradley's opinion as a specialist in the group.

Epiblemma littoralana Pierce (1439 in Heslop's list), sinks as a synonym of *E. enicicolana* Zell. (1438).

Rhopobota geminana Steph. (1468) similarly sinks as a synonym of *R. naevana* Hübn. (1467).

The authority for *Lobesia littoralis* (1522) is Westwood, according to Bradley, not Curtis.

The species 1544 in Heslop's list has the synonymy reversed and should be *Hedya nubiferana* Haw. (*variegana* Hübn.).

In the genus *Eucosma*, Heslop gives *scopoliana* Haw. nec. Schiff. as a synonym of *E. hohenwartiana* Schiff. (1419), but shows *E. parvulana* Wilk. as a separate species (1420). Bradley (*loc. cit.*) shows both *parvulana* Wilk. and *scopoliana* Haw. nec. Schiff. as forms of *E. hohenwartiana* Schiff. He confirms (*in litt.*) that he considers them both to be biological forms.

A similar situation occurs with Heslop's species 1436 and 1437. In Bradley's opinion (*loc. cit.* and *in litt.*) *cirsiana* Zell. is a biological form of *Epiblemma scutulana* Schiff.

One of the most confusing points concerns 1324 *Acleris niveana* F. In Bradley's list (1956, *loc. cit.*, 7: 154) it is species 77 *Acleris logiana* Clerck. It is a pity that Heslop did not show *logiana* Clerck in synonymy which would have closely associated the species in the two lists; and the situation is further confused by the spelling of the name in Heslop which should be *niveana*. The name *logiana* Clerck appears to have caused some considerable trouble to authors, and it was because of the difficulty of satisfactorily settling whether *logiana* is in fact *niveana* or *A. sponsana* Schiff. & Denis that Heslop has rejected it. In view of the fact that Bradley (1956), Obratsov, N. S. (1956, *Tijdschr. ent.* 99: 136) and Hannemann, J. (1961, *Die Tierwelt Deutsch.* 48: 58) agree as to the application of the name *logiana* Clerck with *niveana* F. (*niveana*) as a synonym it seems pointless to be arbitrary and differ from this usage.

PYRALIDAE (Lep.)

Attention is drawn to the paper by Whalley, (1961, *Ent. Gaz.*, 12: 113) which sinks *Cadra woodiella* Richards & Thomson, as a junior synonym of *C. parasitella* Staud.

CURCULIONIDAE (Col.)

The last species of *Ceuthorhynchus* are listed by Kloet and Hincks (1945 *Check List of British Insects*, p. 216) as *chalybaeus* Germ. *chalybaeus* Germ. v. *timidus* Weise, and *moguntiacus* Schultze. These are the subject of a paper by Kevan (1961, *Ent. mon. Mag.*, 97: 30-31) He regards *timidus* Weise as a good species as indeed does Strand (1960, *Norsk. ent. Tidsskr.*, 11: 160-166), Künnemann (1920, *Ent. Mitt.*, 9: 70-78, 124-130), Hoffman (1954, *Faune de France*, 59: 901) and Reitter (1916, *Fauna Germanica*, 5: 174); and our own two standard works, Fowler (1913, *Col. Brit. Is.*, 6: 195) and Joy (1932, *Brit. Beetles*, 1: 196). It is rather puzzling in the face of this how Kloet and Hincks made a variety of the beetle. However, the main point of Kevan's paper is that these three species are known by different names on the Continent, and *chalybaeus* Germ. has been applied to two different species. Germar's type is unfortunately not available, and authorities have different opinions as to the true identity of *chalybaeus* Germ.

Kevan suggests that the name *chalybaeus* should be *sedis incertae* and its use should be avoided, except in synonymy. He therefore suggests the following names should be used:

pectoralis Weise (*chalybaeus* auctt. Brit., ?German).

timidus Weise (*chalybaeus* auctt. Eur., ?German = *moguntiacus* Schultze).

thomsoni Kolbe (*moguntiacus* auctt. nec Schultze).

This would seem to be a sensible solution to a most difficult situation, and is one that will be followed in our publication. In passing it is interesting to note that Fowler (*loc. cit.*) became involved in this problem but failed to find the correct solution.

EULOPHIDAE (Hym.)

It is very seldom indeed that we are concerned with this family of insects, but attention should be drawn to the important paper by M. W. R. de V. Graham (1961, *Ent. mon. Mag.* **97**: 34-64). "The genus *Aprostocetus* Westwood, *sensu lato* (Hym., Eulophidae); notes on the synonymy of the European species". In this paper *Tetrastichus* Walker and *Ceraninus* Walker *sensu* Förster, amongst many others are sunk as synonyms of *Aprostocetus*. This in itself presents a considerable change from the Check List of Kloet and Hincks; but in addition a considerable amount of synonymy of trivial nomenclature is involved.

CONIOPTERYGIDAE (Neur.)

Ward, P. H. (1961, *Ent. Gaz.*, **12**: 114), confirms synonymy in the genus *Parasemidalis* queried by Kloet & Hincks (1945, *Check List of Brit. Insects*). The correct synonymy is *Parasemidalis fuscipennis* (Reuter, 1894) (*annae* (Enderlein, 1905)).

CERYLONIDAE (Col.)

Attention is drawn to the sinking of *Cerylon primroseae* Donisthorpe as a synonym of *C. ferrugineum* Steph., and the removal from our list of *C. deplanum* Gyll. by Allen, A. A. (1962, *Ent. mon. Mag.*, **98**: 13-14).

CISIDAE (Col.)

The following changes are made in the genus *Cis* by Allen (1962, *loc. cit. supra*, **98**: 14-16): *C. latifrons* Pool sinks as a synonym of *C. coluber* Abeille; *C. quadridentulus* Perris is removed from our list; *C. savilli* Donisthorpe sinks as a synonym of *C. hispidus* Payk.; and in *Ennearthron*, *E. elongatulum* Gyll. is deleted from our list.

MALACHIIDAE (Col.)

The following has been submitted by Mr. A. E. Gardner for inclusion in this part of our Proceedings: *Malachius lusitanicus* Erichs. v *australis* Rey (Col., Malachiidae) deleted from the British List.

Donisthorpe (1931, *Ent. mon. Mag.*, **67**: 194) added this species to our Coleopterous fauna on the strength of having swept a single example from long grass in Windsor Forest, Berks., on 16th June 1930, since when no more specimens appear to have been captured. Joy (1932, *A Practical Handbook of British Beetles*, Addenda, p. 621) included a revised key to the *Malachius* and separated *lusitanicus* from

Cipustulatus (L.) on antannal characters, the former species having the antennal shorter, inserted closer together and joints 5-10 hardly twice as long as broad.

On 3rd June 1962, I took several small *Malachius* at hawthorn blossom in Windsor Forest which appeared referable to *lusitanicus* as compared with Donisthorpe's specimen now in the British Museum (Nat. Hist.). However, on critically measuring the antennae of all the specimens I found the length to width ratio to be identical with normal *bipustulatus*. Later when looking at the Donisthorpe collection I noticed that Mr. A. A. Allen had added a det. label bearing the inscription *bipustulatus* to the Donisthorpe specimen so it is evident that he shares my view.—A. E. GARDNER.

BOOK REVIEWS

British Flies. Vol. VI. Empididae. Part III. Empidinae (Part) and Hemerodrominae. By J. E. Collin. 8vo., pp. 553-782. Figs. 206-317. Cambridge: Cambridge University Press. 1961. Price 30/-.

The final part has quickly followed its predecessors and retains their excellence and value for money. The genus *Hilara* forms the bulk of this part, concluding the Empidinae. The genus is divided into five groups but these differ in composition from the five groups in Kloet & Hincks' "Check List" based on the author's paper in *Ent. mon. Mag.*, 1927. The fifth group is now divided into three sub-groups. The characteristics of each group and sub-group are given in succinct manner. The Hemerodrominae remain in the nine genera of the "Check List" with *Wiedemannia* and *Clinocera* divided into the four and three sub-genera respectively as before.

Four new species are described. The few nomenclatorial changes include the acceptance of *Hilara diversipes* Strobl as *H. germanica* Engel, *Chelifera erecta* Collin as *C. stigmatica* Schiner, *Synamphotera pallida* Lw. as *Dryodromia testacea* Rond., *Clinocera barbatula* Mik. var. *securigera* Engel as *C. tenella* Wahlberg and *Wiedemannia fallaciosa* Lw. of R. L. Coe as *W. impudica* Mik. There is one deletion from the British List—*Hilara eumera* Lw.

The 102 figures include 313 items, making a total of 844 drawings for the whole volume. With very few exceptions, each genus has a species illustrated by a complete fly and each species with a figure of the male genitalia. The many collectors who are unable to consult type collections are now able to compare insect with picture to ensure that their understanding of the descriptions is correct. This is a great advance over all previous British monographs on Diptera, other than the lavishly illustrated "British Mosquitoes" of J. F. Marshall, which unfortunately did not deal with the complete family of Culicidae of this country.

The part concludes with a page and a third of supplementary notes, seven items of errata to the first and second parts, and the well-prepared index. This includes both synonyms and the names of doubtfully identified species. It will thus be a great aid in associating correct names to those used in earlier publications dealing with the distribution and habits of this family.

The whole volume is also published in a cloth binding, at £5. in the same colour as the original two volumes by G. H. Verrall. The successful conclusion of the production of this great work must crown the author's lifetime's study. His great knowledge and helpfulness are known all over the world by those who have been privileged to meet or correspond with him. This can now be shared by all. The work should encourage many to study diptera and aid those interested in the life

histories and distribution of this family of flies whose habits are already known to be so interesting, as predators and in their courtship.

L. P.

International Code of Zoological Nomenclature, adopted by the XV International Congress of Zoology, London, 1961, 176 pp., 20/-.

At last the "Rules" are again in print and available to all who wish to obtain a copy. As a code for all nomenclators and a basis for revisers and other workers this volume is indispensable and should be in the hands of all serious zoologists. It is written in parallel French/English translation, the French on the left (verso) page with English matching it almost line for line on the right (recto) page.

There is a Preface in English only by J. Chester Bradley, the President of the International Commission on Zoological Nomenclature, and a substantial Introduction, also in English only, by Norman K. Stoll, the Chairman of the Editorial Committee. There is also an explanatory note and a Preamble.

The Code itself is well set out and interspersed with numerous recommendations, examples and notes. These are clearly separated from the Code proper not only by the clear statement "Recommendation", "Example" or "Note", but also by being set in a size smaller type.

Following the Code are five appendices: (A), Code of ethics; (B), Transliteration and latinisation of Greek words; (C), Latinisation of geographical and proper names; (D), Recommendation of the formation of names; and (E), General recommendations. The work ends with a glossary and an index.

The Code has, in many quarters, a reputation for being difficult, complicated and confusing, and in this respect it must be remembered that the Code must be formulated to cover all eventualities and circumstances, and this leads to a document reminiscent of the work of the legal profession; it is, therefore, remarkable that it is no more complicated than it is. In any case, much of the difficulty has been the result of the use (or lack of use) to which it has been put. If the code is read; all of it from beginning to end, and a genuine effort made to understand, not only the words but the concept behind them, one should experience little difficulty with the application of it; though perhaps one may disagree with particular sections.

In the past there has been much criticism of the requirement that the trivial name must agree in gender with the generic name. Presumably this has received very careful consideration and your reviewer finds it difficult to understand why this is retained. The percentage of nomenclators and revisers with a classical language background must be steadily declining and one feels that this subsection of Article 11 will tend to be honoured rather in the breach than in the observance. However, these are the rules and should not be disregarded even if one disagrees.

The Code has a restricted application to Zoological nomenclature inasmuch as it does not relate to names outside the superfamily-

subspecies range. J. Chester Bradley in his preface says "The failure of the Code to deal with names of higher rank than superfamily or of lower rank than subspecies arises from no failure to recognise the necessity of such names. It exists because the practice of zoologists in regard to them is not sufficiently uniform to permit the formulation of rules covering them at this time". With regard to infra subspecific nomenclature in particular the last sentence is a masterly understatement—the fact is that this section of nomenclature is a veritable jungle of confusion. How Bradley and his colleagues expect matters to improve of their own accord is beyond understanding. The urgency seems to be in the infra subspecific field rather than above superfamily level, though no doubt rules here would clear many of the difficulties.

Whilst it is obvious that there are objections it would appear that the same relationship as exists between trivial and generic names could well be used for all names from subspecific downwards. As a basis this would be worthy of the Commission's immediate consideration. It would render unnecessary the ranking of infra subspecific nomenclature, thus leaving the problem of the range of use of different kinds of names, aberration, form, etc., to be settled.

The index of the work is inadequate and could very well have been considerably extended. While it is easy to refer to individual Articles one finds it almost impossible to locate specific points readily and it is often necessary to search the volume for them. No doubt, as one uses the book one will learn where to find things, but this does not excuse a poor index.

Considering this publication is for world circulation, one hopes over a number of years, the cost is high. A paper bound volume could, it is felt, have been produced in quantity for something like 7/6. At a figure like this far more people would have bought a copy, but 20/- is much more likely to restrain potential purchasers. A much more adventurous policy should have been adopted for circulation because a restricted distribution can result in nothing but harm.

In spite of the criticisms, which really are few, and the price, your reviewer not only recommends purchase of the volume but urges it; and then when it is bought—use it.

F. D. BUCK.

Bird Song. The biology of vocal communication and expression in birds, by W. H. Thorpe. Pp. xii, 143, 65 figures. Cambridge University Press, 1961, 20/-.

An up-to-date and authoritative account of the findings of experiment and observation on the significance of songs and call-notes in the life of the bird is to be welcomed.

Many take pleasure in bird-song, but comparatively few have given it more than passing thought. Dr. Thorpe is one of the few outstanding workers in this field of study.

Modern techniques in recording have made possible great advances, and now tape-recordings can be compared and analysed to show structural features in the song which naturalists were aware of but

could hardly prove in the absence of satisfactorily written representations capable of conveying exact meaning to others. But tape-recordings can do much more than this as the author shows.

Dr. Thorpe deals with many aspects of vocal expression in birds; song, sub-song, the learning and improvement of song, individual and regional variation, and the calls of young together with parental responses.

The fact that many problems are incompletely solved is a challenge to the numerous bird-watchers of this country.

Everyone may not be able or willing to use modern recording apparatus but observations in the field with keen ears and eyes, and a receptive, unbiased mind can be helpful, especially when one remembers that songs and calls are part of a behaviour pattern in the bird and often a very important part of its reactions to given circumstances.

There is in this book a useful and informative account of the structure and mechanics of the bird's vocal apparatus, together with a commentary on its hearing and voice production compared with those of man.

The author has drawn freely on the work of specialists both here and abroad, and a very full list of references will be invaluable to the serious reader who wishes to pursue the subject further.

It is pleasing to find a well-arranged index: indispensable in a work of this kind. Anyone interested in birds, and having read this book, cannot fail to be stimulated to give increased attention to the subject of bird-song and call-notes.

W. H. SPREADBURY.

Transactions of The Lincolnshire Naturalists' Union, Part 2, vol. 15.

8vo, 87 pp. plus 2 pp. of half-tone plates and 3 text figures.

Lincoln: Lincolnshire Naturalists' Union, 1961. Not priced.

This is the second part of volume 15, presumably part I is the Proceedings, and is a publication of interest to students in most branches of natural history. The Presidential Address, "Introduction to Arachnology", by Mr. G. W. Whatmough is a most workmanlike job and makes very interesting reading indeed, dealing with collecting techniques, habitats, preservation and storage, and includes some suggestions for local study. The paper includes the only half-tone plates in the volume, and consists of four very nice photographs by Peter J. Wilson. Concluding the Address is a valuable bibliography for anyone who intends to take up the study.

A paper by E. C. Rigall swells the rapidly growing literature on insect migration, but as he confines himself to the mechanics of the subject our lepidopterists who show so much interest in the subject might find it will repay reading.

The final paper deals with glacial deposits in the Lincolnshire wolds and is perhaps of less interest to our members.

Apart from the reports of the Hon. General Secretary-Treasurer and the field meeting Secretaries there is a report for each section, and these

cover a wide range of natural history subjects including entomology, arachnology, botany and the inevitable ornithology.

It is a pity the price is not indicated, much of interest can be found in the pages and it is felt that without the knowledge of the price sales might be prejudiced.

F. D. B.

The Naturalist on the River Amazon by Henry Walter Bates. 8vo., pp. viii and 465 and numerous text figures. Berkeley and Los Angeles, California University Press (for whom the Cambridge University Press act as agents). 1962. Price 21/-.

What can one say about this book? That it is old fashioned? That the Amazons have changed? That the nomenclature is vague in the light of modern knowledge? All true; but this work is, like Gilbert White's *Natural History and antiquities of Selbourne*, an outstanding classic amongst works on Natural History. Bates was a tireless worker in all aspects of natural history and it is primarily due to him that we know so much of the fauna and flora of the Amazonian terrain and have so much type material in this country. It was therefore with considerable pleasure that your reviewer was able to read the work for the first time.

Even now the book is of great interest, and though much longer than most modern books, particularly those falling into this category, it retains the interest throughout. One of the significant points which show the perceptiveness of Bates' observations is his remarks about the probable eventual extermination of the Amazonian Indian; a matter which is giving the modern Brazilian government cause for some thought.

A foreword is written by Robert L. Usinger which provides an excellent background to the book, and it is perhaps a subtle compliment to Bates and his work that Usinger eschews the modern American spellings in favour of our more conventional word forms. The difference in type face between the foreword and the text leads one to believe the present edition may have been photographically copied from the second edition published by John Murray in 1864. In any case the chapter headings have been simply and pleasingly modernised.

The edition is paper covered and the binding unsewn—a form of binding which is normally not regarded as being very substantial. In this case it is as good as any of its kind seen.

F. D. B.

Flora of the British Isles, Second Edition, A. R. Clapham, T. G. Tutin and E. F. Warburg, pp. xlviii + 1270, 87 line blocks, $8\frac{1}{2}'' \times 5\frac{1}{2}''$, Cambridge University Press, 1962, 70/-.

When one said that a second edition was forthcoming one was invariably asked, "Why, so soon?". An obvious reason is the great activity of botanists during the past decade and the resulting new material for incorporation. The question does, however, lead one to compare the second edition with the first. The second is more strongly bound, has a more impressive spine, is a more convenient size, and, most

important of all, is on thicker paper. This last improvement will make it much easier to handle. There are eight more figures; and all the figures show up better because of the thicker paper. References to previous works were given for each species in the first edition but are now omitted, presumably being no longer needed.

So much new material appeared in the first edition that errors were inevitable and an errata sheet was issued by the publishers. These have been corrected but naturally there are still a few. Perhaps the most unfortunate is this inversion of the figures of *Carex* fruits in Fig. 81 on p. 1109. The student should pencil the letters E, D, C, B, A, and delete the printed letters. Page 1257 is headed 4257, a very harmless error.

Five of the new figures are devoted to *Orchidaceae* and in the text the genus *Orchis* has been divided with the result that two familiar species (*maculata* and *fuchsii*) become *Dactylorchis*. The first edition spoke of the division of *Polypodium vulgare* into three species and now they are fully set forth. The Water Crowfoots are difficult. In the first edition Fig. 6 depicted the achenes of 12 species. The corresponding figure now shows leaves instead of achenes. These drawings will, it is thought, be more helpful. Some dubious species have been dropped from the text and, if appropriate, from the figure. For instance in fig. 27 on p. 199 the drawings of *Polygala oxyptera* and *P. austriaca* are omitted.

One is pleased to see *Lysichiton americanum* and *Euphrasia vigursii* dealt with. The beautiful little "Early Forget-me-not" which we have known as *Myosotis hispida* or *M. collina* becomes *M. ramosissima*. The treatment of the entomologist's friend *Polygonum aviculare* (Knotgrass) has been improved by dividing this aggregate into four species. Brief references are made to *Polygonum campanulatum* and to the familiar *P. baldschuanicum*. Naturally the treatment of parts of the genus *Rubus* is much modified following the publication of the book by W. C. R. Watson (*Handbook of the Rubi of Great Britain and Ireland*) where the aggregate *Rubus fruticosus* is divided into 386 species.

No botanist should be without this book. The first edition was a great blessing but it is now superseded by an even better work. This has happily appeared early in the season instead, as sometimes happens with new books, just as the season is over.

T. R. EAGLES.

CORRIGENDA.

In the 1960 volume, on page 59, the presentation of about 70 miscellaneous separates, and a run of the Transactions of the Suffolk Naturalists's Society, was incorrectly attributed to Mr. E. S. A. Baynes. The generous benefactor was, in fact, Mr. B. Embry.

On page 39 of the Volume for 1960, nine lines from bottom of the page, in Lt.-Col. & Mrs. Manley's exhibit *Erebia palarica* Chapman is recorded from Valencia, this is an error and should read Palencia.

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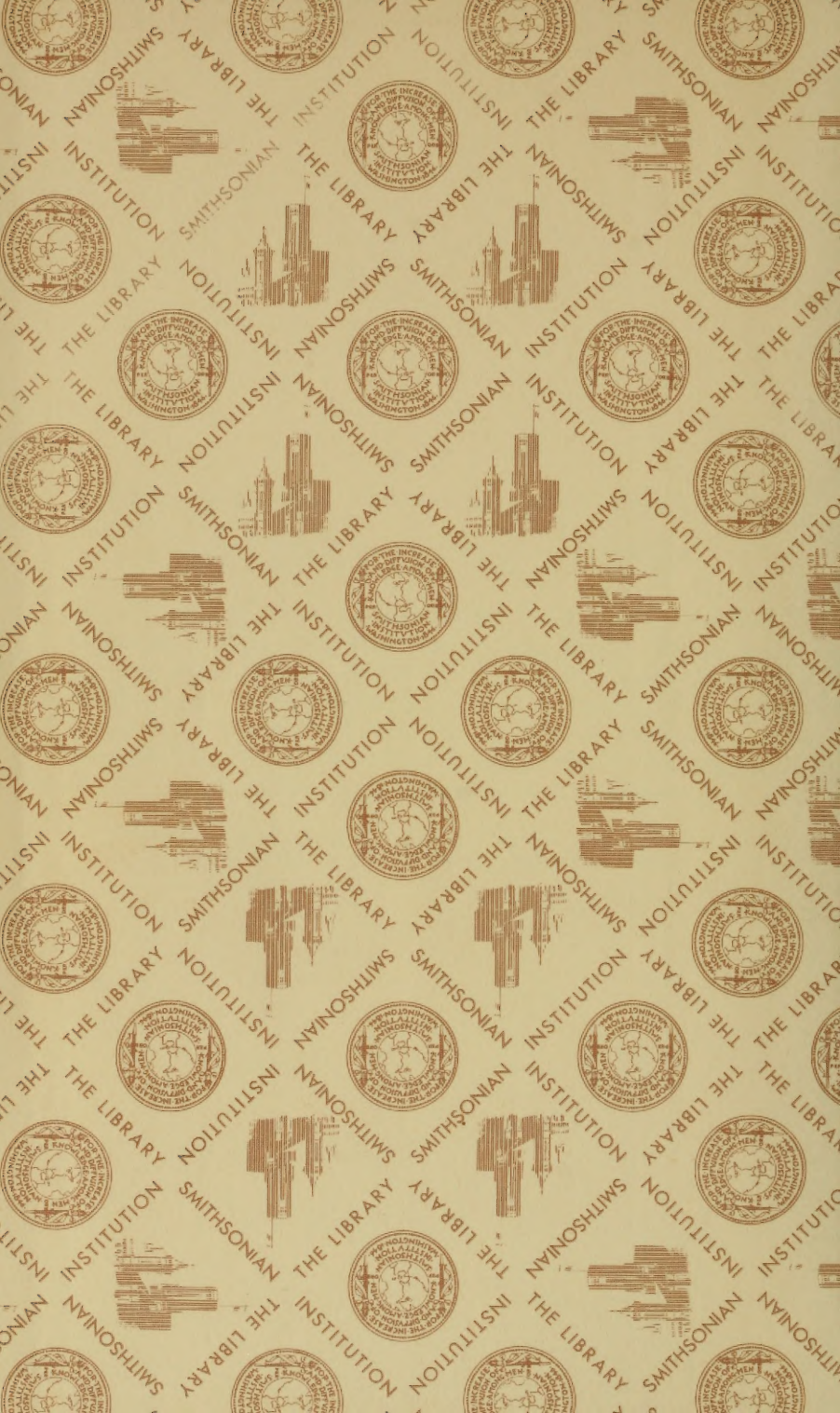
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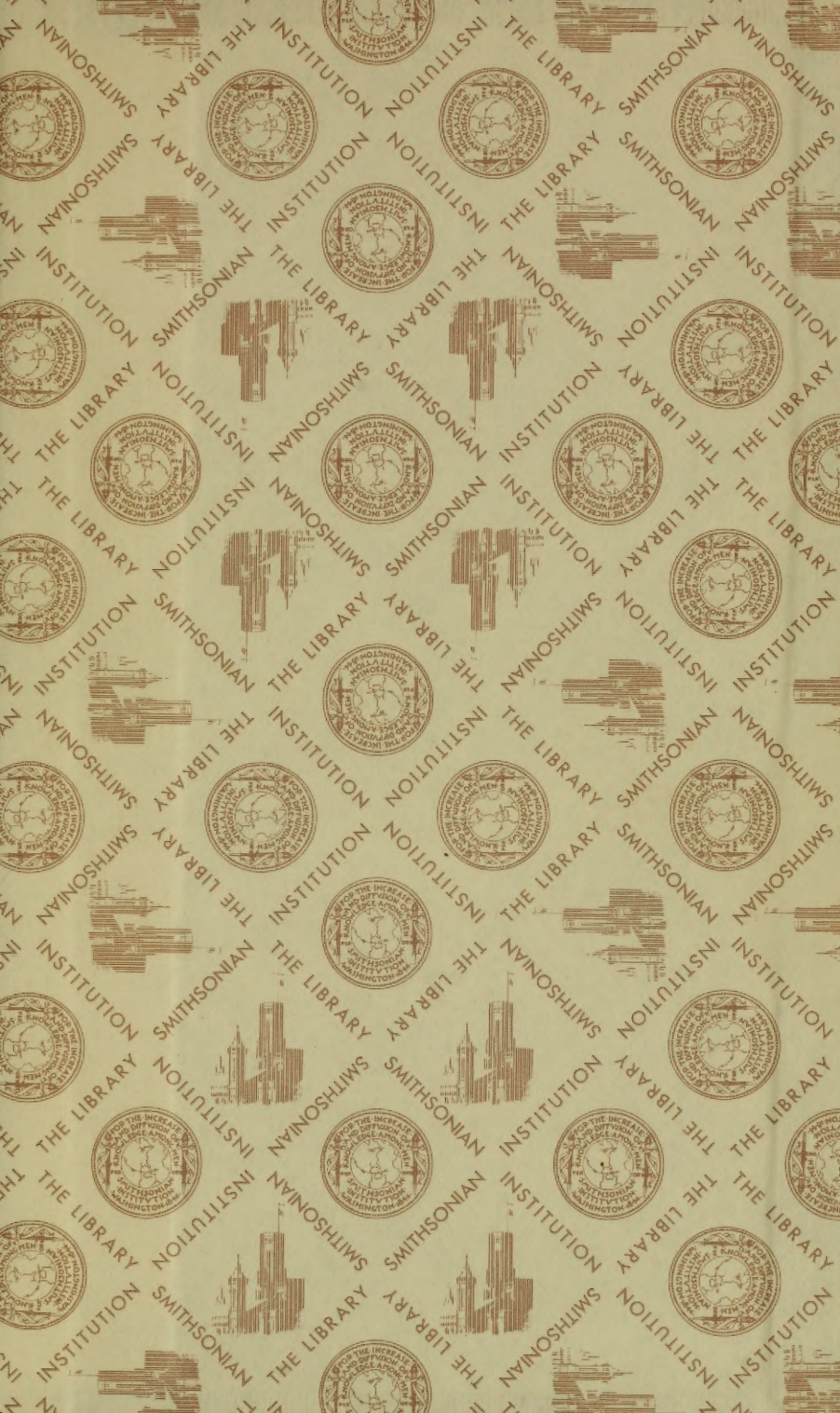
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